

**PLACER COUNTY AIR POLLUTION CONTROL DISTRICT**

**FINAL DETERMINATION OF COMPLIANCE**

**ROSEVILLE ENERGY PARK  
ROSEVILLE ELECTRIC**

**160 Megawatt Maximum  
Electrical Power Generating Facility with  
Two Natural Gas-Fired Combustion Turbines**

**5400 Phillip Road, Roseville, California**

**November 1, 2004**

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**Application Number:**      **Application for Certification (AFC) #03-AFC-01**  
   **District Application #AC-03-102**

**Company Name:**              **Roseville Electric**

**Project Name:**                **Roseville Energy Park**

**Project Location:**            **5400 Phillip Road, Roseville, California**  
   **Assessor Parcel No. 017-100-029 and 017-100-030**

**Date of Application:**        **October 30, 2003 (Energy Commission Filing)**  
   **November 6, 2003 (District Filing)**

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## **I. PROPOSAL**

Roseville Electric has filed an application for an electrical power generating facility designated the Roseville Energy Park which is nominally rated at 125 megawatts (MW) with a maximum capability of up to 160 megawatts. Roseville Electric is the Electric Department for the City of Roseville. The proposed facility would use natural gas fired, combined cycle, combustion turbine generator technology for electrical power generation.

The proposed project location is 5400 Phillip Road, Roseville, California. The site is within the limits of the City of Roseville across the road from the Pleasant Grove Waste Water Treatment Plant.

## **II. INTRODUCTION**

On October 30, 2003, Roseville Electric submitted an Application for Certification (AFC) #03-AFC-01 for the Roseville Energy Park to the California Energy Commission (Energy Commission). The Energy Commission has the exclusive authority to license power plants that have a generating capacity of 50 megawatts or greater. The Energy Commission is the lead agency for the project for the requirements of the California Environmental Quality ACT (CEQA).

The Placer County Air Pollution Control District (PCAPCD) participates in the process with other agencies to ensure that the project will comply with applicable rules and regulations.

Roseville Electric filed an application with the PCAPCD on November 6, 2003. The application was deemed complete on November 26, 2003. PCAPCD staff has completed an initial review and engineering analysis. A preliminary decision on whether the proposed power plant is expected to meet the requirements of applicable air rules and regulations was provided on May 25, 2004 in the document which is called the Preliminary Determination of Compliance (PDOC).

The PDOC was forwarded to the Energy Commission, the California Air Resources Board, the U.S Environmental Agency (EPA) and interested parties for a thirty day comment period. The applicant requested an extension of the comment period until July 9, 2004. A subsequent request was made for an extension until July 23, 2004. A public notice was issued by the District to allow parties and the public the same amount of time to comment.

A number of changes have been requested by Roseville Electric. The primary request is to reduce the permitted quarterly emissions of nitrogen oxides (NOx) to match the available offsets. The offset package proposed has also been revised. There were no changes to the power plant or air pollution control equipment.

In addition, a number of comments have been received from the U.S. EPA and the Energy Commission. These may be found in Appendixes I and J, along with PCAPCD responses. Changes with which the PCAPCD concurred are noted in the responses. No written comments were received from members of the public.

This document is the Final Determination of Compliance (FDOC) by the PCAPCD. The FDOC will be forwarded to the Energy Commission for consideration in their review of the Application for Certification. The document will also be forwarded to ARB and EPA and made available for review by the public after a notice has been published in the newspaper.

A list of acronyms used in this document is shown in Appendix A.

### **III. OPERATING SCHEDULE**

Roseville Electric has proposed the following maximum operating schedule in each quarter. These hours were utilized in determining the maximum quarterly air emissions and quantity of offsets required. The exception is that NOx quarterly emission limits have been reduced below the quantity of emissions that would result from these operating hours and will be monitored by the continuous emissions monitor system (CEMS). Accordingly, the operating schedule will be limited by both the maximum operating schedule and, if resulting in fewer hours

per quarter, the total NOx for which ERCs have been obtained. See the Sections VII, Emissions, and IX, Offset for additional information.

<b>Table 1 - Power Plant Gas Turbine Operating Schedule</b>					
	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup></b>	<b>Annual</b>
Base load only hours	1,123	1,188	751	852	3,914
Peaking hours (duct firing)	929	559	1,347	1,246	4,081
Total startup hours	44	117	34	47	242
Total hours	2,096	1,864	2,132	2,145	8,237

<b>Table 2 – Power Plant Auxiliary Equipment Operating Schedule</b>					
	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup></b>	<b>Annual</b>
Auxiliary Boiler	140	568	143	143	995
Emergency Generator	12.5	12.5	12.5	12.5	50
Fire Pump	12.5	12.5	12.5	12.5	50
Notes: (1) Emergency generator and fire pump engines to be run for no more than 50 hours per year including maintenance and testing. These hours may be limited to 20 hours per year when CARB Diesel ATCM for Stationary Diesel Engines becomes effective.					

#### **IV. EQUIPMENT DESCRIPTION**

Roseville Electric proposes to use either two General Electric (GE) LM6000 or two Alstom GTX100 combustion turbine generators (CTGs). The GE CTGs are estimated to generate up to 47 MW each at average ambient conditions. The Alstom CTGs are estimated to generate up to 43 megawatts each, at average ambient conditions. Either design will include heat recovery steam generators (HRSGs) with duct burners. One steam turbine will provide an additional electrical generating capacity of up to 30 megawatts in the GE design and 43 megawatts in the Alstom design at ambient conditions, without operation of the HRSG duct burners. The duct burners will increase the maximum capacity to 160 MW, after subtracting all internal auxiliary loads.

The major equipment at the plant include:

- Two (2) natural gas-fired, combined cycle, combustion turbine generators (CTGs). Roseville Electric proposes to use either the GE LM6000 PC Sprint or Alstom GTX100 gas turbines.

- Two (2) heat recovery steam generators (HRSG) with duct burners. The duct burners in the GE design are each rated at 255 MMBtu/hr. The duct burners in the Alstom design are each rated at 225 MMBtu/hr.
- One (1) steam turbine generator
- One (1) auxiliary natural gas-fired boiler rated at 58 MMBtu/hr, 40,000 pounds per hour of steam
- One (1) 1,133 horsepower, 750 KW diesel engine standby generator.
- One (1) 300 horsepower, diesel engine fire pump.
- Two (2) 120 feet high stacks.
- One (1) cooling tower with four cells.

### Gas Turbines

Gas turbines are internal combustion engines that operate with a rotary rather than a reciprocating motion. A gas turbine has three main components: a compressor, combustor and a turbine. Air is drawn in and compressed. The compressed air is fed to a combustor section along with the fuel. The mixture is ignited and burned. Hot gases are directed to the power turbine. Energy from expansion of the hot gases in the power turbine is recovered in the form of shaft horsepower. The hot exhaust gases from the combustion turbine generator flows to a heat recovery steam generator.

The heat recovery steam generators produce steam that powers the steam turbine generator. Auxiliary duct burners in the heat recovery steam generators are included to add heat and increase the electrical generation peak output of the plant.

### Auxiliary Boiler

An auxiliary boiler, rated at 58 MMBtu/hr and capable of providing up to 40,000 pounds per hour (lb/hr) of saturated steam at 600 pounds per square inch gauge (psig) is proposed to provide steam when the CTGs are not operating. The boiler does not provide steam for electrical power generation. It will provide steam to the HRSG for drum sparging, condenser hotwell sparging, steam turbine glands, and deaeration when the plant is offline.

## **V. AIR POLLUTION CONTROL EQUIPMENT DESCRIPTION**

Roseville Electric has proposed using either two Alstom GTX gas turbines or two GE LM6000 gas turbines. These will be discussed separately in this section.

## **Alstom GTX100 Gas Turbines**

### **Dry Low NOx Combustors**

The primary mechanism by which nitrogen oxides (NO<sub>x</sub>) form in natural gas turbines is thermal NO<sub>x</sub>. Thermal dissociation during combustion and the subsequent reaction of nitrogen (N<sub>2</sub>) and oxygen (O<sub>2</sub>) in the air form NO<sub>x</sub>. The maximum thermal NO<sub>x</sub> formation occurs at a slightly fuel lean mixture because of excess oxygen available for the reaction.

According to the U.S. EPA, Compilation of Air Pollution Emission Factors, AP-42, the combustion process in a gas turbine can be classified as diffusion flame combustion, or lean-premix staged combustion. In the diffusion flame combustion, the fuel/air mixing and combustion take place simultaneously in the primary combustion zone. This generates regions of near-stoichiometric fuel/air mixtures where the temperatures are very high. For lean-premix combustors, fuel and air are thoroughly mixed in an initial state resulting in a uniform, lean, unburned fuel/air mixture which is delivered to a secondary stage where the combustion reaction takes place. Manufacturers use different types of fuel/air staging, including fuel staging, air staging or both; however the same staged, lean-premix principle is applied. Gas turbines using staged combustion are also referred to as Dry Low NO<sub>x</sub> combustors. These combustors are called “dry” because they do not use water or steam injection.

The proposed Alstom GTX gas turbines utilize Dry Low NO<sub>x</sub> combustors. Lower NO<sub>x</sub> emission rates are achieved by the design of the combustor and fuel injection nozzles that optimize the mixing of combustion air and fuel at peak flame temperatures.

### **Selective Catalytic Reduction**

NO<sub>x</sub> emissions will be further reduced by installation of a selective catalytic reduction system (SCR). The SCR consists of a catalyst bed and an ammonia injection system. Both are located within the heat recovery steam generator. The ammonia reduces NO<sub>x</sub> to N<sub>2</sub> and O<sub>2</sub> in the catalyst.

### **Oxidation Catalyst**

Carbon monoxide (CO) and volatile organic compounds (VOCs) emissions are caused by the incomplete combustion of natural gas in the CTGs and HRSGs. Carbon monoxide occurs when there is insufficient residence time or incomplete mixing to complete the fuel oxidation. VOCs are emitted when some of the fuel remains unburned. Some of the VOCs are byproducts of the combustion.

VOCs and CO are reduced by an oxidizing catalyst installed in the heat recovery steam generator. The oxidization catalyst promotes the formation of CO<sub>2</sub> and H<sub>2</sub>O.

### **GE LM6000 Gas Turbines**

#### **Water Injection**

Roseville Electric proposes to use water injection in the GE gas turbines to reduce NO<sub>x</sub>. Small amounts of water are injected into the combustor burner flame. NO<sub>x</sub> emissions are reduced by cooling the combustion temperature.

#### **Selective Catalytic Reduction**

NO<sub>x</sub> emissions will be further reduced by installation of a selective catalytic reduction system (SCR). The SCR consists of a catalyst bed and an ammonia injection system. Both are located within the heat recovery steam generator. The ammonia reduces NO<sub>x</sub> to N<sub>2</sub> and O<sub>2</sub> in the catalyst.

#### **Oxidation Catalyst**

Carbon monoxide and volatile organic compounds (VOCs) emissions are caused by the incomplete combustion of natural gas in the CTGs and HRSGs. Carbon monoxide occurs when there is insufficient residence time or incomplete mixing to complete the fuel oxidation. VOCs are emitted when some of the fuel remains unburned. Some of the VOCs are byproducts of the combustion.

VOCs and CO are reduced by an oxidizing catalyst installed in the heat recovery steam generator. The oxidization catalyst promotes the formation of CO<sub>2</sub> and H<sub>2</sub>O.

### **Auxiliary boiler**

The plant design includes an auxiliary boiler to be used when the plant is not generating electricity. The auxiliary boiler is to be equipped with an ultra low-NO<sub>x</sub> burner and flue gas recirculation to control the stack NO<sub>x</sub> concentration to not more than 9 ppmv at 3 percent oxygen and the CO concentration to not more than 50 ppmv at 3 percent oxygen.

### **Standby Generator Diesel Engine**

The plant design includes a 750 kW, standby generator driven by a 1133 horsepower diesel engine. The generator will provide power if the facility is not operating and there is an outage on the 60kV system. The generator is designed to provide essential power to the plant but not to provide power for a "black start" or power to the grid. The application indicated the standby generator diesel engine has emissions of 7.17 grams per horsepower-hour.



The PCAPCD's BACT for NO<sub>x</sub> is 6.9 grams per horsepower-hour for an engine of this type. This emission level is achieved by engine design and is readily available from new EPA certified engines. This has been discussed with the applicant and they have agreed to use an engine meeting the 6.9 grams per brake horsepower-hour emission level for NO<sub>x</sub>.

### **Fire Pump Diesel Engine**

The plant design includes a fire pump driven by a 300 horsepower diesel engine. BACT is triggered for NO<sub>x</sub>. The application indicates the engine has emissions of 5.2 grams per horsepower hour. This diesel engine meets the PCAPCD's current BACT level of 6.9 grams per horsepower hour.

## **VI. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)**

Best Available Control Technology is defined by District Rule 502, New Source Review, as the most stringent of:

- a. The most effective emission control device, emission limit, or technique, singly or in combination, which has been required or used for the type of equipment comprising such an emissions unit unless the applicant demonstrates to the satisfaction of the Air Pollution Control Officer that such limitations required on other sources have not been demonstrated to be achievable.
- b. Any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible and cost-effective by the Air Pollution Control Officer.
- c. For replacement equipment only, the emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of the source.
- d. In making a BACT determination for nonattainment pollutant the Air Pollution Control Officer may consider the overall effect on other nonattainment pollutants. In some cases the lowest emission rates may be required for one or more nonattainment pollutants at the cost of not achieving the lowest emission rate for other nonattainment pollutants. The Air Pollution Control Officer shall discuss these considerations in the Preliminary Decision prepared pursuant to Section 403.

The California Air Resources Board (CARB) published the Guidance for Power Plant Siting and Best Available Control Technology (September, 1999) to address permitting issues for new power plants and identify CARB staff's determination of BACT. The following table shows CARB's BACT for combined cycle turbines.

<b>Table 3 - CARB BACT</b> <b>From Guidance for Power Plant Siting and Best Available Control Technology</b> <b>(September, 1999)</b>				
NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	SO <sub>x</sub>
2.5 ppmvd @ 15% O <sub>2</sub> , 1-hour rolling average OR 2.0 ppmvd @ 15% O <sub>2</sub> , 3-hour rolling average	6 ppmvd @ 15% O <sub>2</sub> , 3-hour rolling average	2 ppmvd @ 15% O <sub>2</sub> , 1-hour rolling average OR 0.0027 pounds per MMBtu (based on higher heating value)	An emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/100 scf	An emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/100 scf (no more than 0.55 ppmvd @ 15% O <sub>2</sub> )
Dry Low NO <sub>x</sub> Combustor, SCR	Oxidation Catalyst	Good combustion control and oxidation catalyst	Exclusive use of utility grade natural gas as fuel	Exclusive use of utility grade natural gas as fuel

The applicant proposes to meet the following levels if the Alstom CTGs are selected:

<b>Table 4 - Roseville Energy Park</b> <b>Proposed Best Available Control Technology – Alstom GTX100</b>				
NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	SO <sub>x</sub>
2.0 ppmvd @ 15% O <sub>2</sub> , 1-hour average	4 ppmvd @ 15% O <sub>2</sub> 3-hour rolling average	2 ppmvd	Exclusive use of pipeline quality natural gas as fuel	Exclusive use of pipeline quality natural gas as fuel
Dry Low NO <sub>x</sub> Combustor, SCR	Oxidation Catalyst	Good combustion control and oxidation catalyst	Exclusive use of pipeline quality natural gas as fuel	Exclusive use of pipeline quality natural gas as fuel

The applicant proposes to meet the following levels if the GE LM6000 CTGs are selected:

<b>Table 5 - Roseville Energy Park Proposed Best Available Control Technology – GE LM6000</b>				
NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	SO <sub>x</sub>
2.0 ppmvd @ 15% O <sub>2</sub> , 1-hour rolling average	4 ppmvd @ 15% O <sub>2</sub> , 3 –hour average	2 ppmv	Exclusive use of pipeline quality natural gas as fuel	Exclusive use of pipeline quality natural gas as fuel
Water Injection, SCR	Oxidation Catalyst	Good combustion control and oxidation catalyst	Exclusive use of pipeline quality natural gas as fuel	Exclusive use of pipeline quality natural gas as fuel

The BACT emission levels in these two previous tables are identical for either turbine options. The difference is the GE LM6000 turbines utilize water injection and the Alstom GTX Turbines utilize low NO<sub>x</sub> combustors.

The PCAPCD BACT analysis is provided in Appendix B. The PCAPCD's review found that the proposed levels do meet BACT requirements for all five criteria pollutants.

However, EPA commented on the CO BACT determination listed in the PDOC and recommended a 2 ppmv level based on the requirements for the City of Vernon power project.

PCAPCD staff contacted South Coast AQMD (SCAQMD) and discussed the requirement to meet 2 ppmv @15% O<sub>2</sub> of CO for the City of Vernon project which includes an Alstom Turbine of the same size as this project.

SCAQMD staff indicated that this level was proposed by the applicant to minimize the quantity of CO ERCs required to offset the project. SCAQMD is designated severe nonattainment for CO and offsets are required for CO. A BACT determination was not made. Construction of the City of Vernon plant has not been completed. PCAPCD concludes that that CO 2 ppmv @15% O<sub>2</sub> on a three hour average has not been achieved in practice.

REP provided an additional CO BACT analysis upon request along with a cost effective analysis. This is included in Appendix B. Their cost analysis indicates a cost effectiveness of \$34,500 per ton.

Based on these findings, the PCAPCD recommends CO BACT as 4 ppmv on a three-hour average. Additional discussion of BACT is provided in Appendix B.

The control equipment and emission limits were determined to meet BACT requirements. Permit conditions will require meeting these limits and demonstrating compliance by performance testing and monitoring.

## **VII. EMISSIONS**

### **Construction Emissions**

Roseville Electric provided an estimate of construction emissions as summarized below:

<b>Table 6 – Construction Emissions*</b>		
Pollutant	Lbs/day	Tons/year
NOx	291.2	18.0
CO	360.7	59.5
VOCs	52.2	7.3
PM-10	20.8	1.35
SOx	23.9	1.0

\*Responses to CEC Staff, Data Requests, February 2004, Attachment Air-3, Construction Emission Tables, Table 7

The construction emissions are significant for NOx, CO and VOCs. The PCAPCD recommended the construction mitigation measures in the PDOC. The Preliminary Staff Assessment (PSA) prepared by the Energy Commission staff proposed construction mitigation conditions. PCAPCD supports the Energy Commissions proposed construction mitigation conditions and have removed the recommended measures listed in the PDOC.

### **Facility Emissions**

The air emissions from the facility were calculated based on (1) data from the turbine manufacturers, (2) data from engine manufacturers, (3) proposed BACT emission rates, and (4) hours of operation shown in Table 1 and number of expected cold, warm and hot starts of the combustion turbines.

The applicant resubmitted emissions tables for the gas turbines to the PCAPCD on April 9, 2004. The revised tables are shown in Appendix C. These were changes to the Alstom GTX100 gas turbine emission rates and revisions to the proposed number of warm starts to be used to calculate emissions from either the GE or Alstom gas turbines.

On August 2, 2004, the applicant requested the PCAPCD to lower the allowed quarterly NOx emissions to match the available offsets. No changes were requested to the allowed hourly or daily emission rates. The proposed offset

package was also revised. No changes were requested for other pollutants emissions. The following table summarizes the proposed change to quarterly NOx emissions levels:

<b>Table 7 - Alstom GTX100 Gas Turbines</b>					
NOx	Quarter 1 (lbs/quarter)	Quarter 2 (lbs/quarter)	Quarter 3 (lbs/quarter)	Quarter 4 (lbs/quarter)	Tons/year
Previous	18,972	18,388	20,185	20,296	38.92
Revised	15,546	13,412	17,646	15,572	31.09
% of previous	81.9%	72.9%	87.4%	76.7%	79.9%

<b>Table 8 – GE LM6000 Gas Turbines</b>					
NOx	Quarter 1 (lbs/quarter)	Quarter 2 (lbs/quarter)	Quarter 3 (lbs/quarter)	Quarter 4 (lbs/quarter)	Tons/year
Previous	17,614	15,491	19,112	18,998	35.61
Revised	15,546	13,412	17,646	15,572	31.09
% of previous	88.3%	86.6%	92.3%	82.0%	87.3%

This approach would require treating NOx quarterly emissions differently than other pollutants. The NOx quarterly limits would be lower than predicted by calculations using the manufacturers data, BACT emission rates, hours of operation and number of cold, warm and hot starts and load projections. The lower quarterly emissions of NOx could be met by a number of operating scenarios or operating practices. For example, if the turbines perform at lower NOx emission levels than the manufacturer guarantee of 2 ppmv, the NOx quarterly emissions will be lower. The 31.09 tons per year (on the quarterly basis shown) could be met by a combination of emission levels lower than 2 ppmv levels, reduced hours of operation, reduced number of starts or load.

For example, if other conditions remained the same, Table 9 shows a possible operating scenario provided by Roseville Electric under which the NOx quarterly emissions could be achieved for the GE LM6000 option by reducing hours of operation. The NOx emissions from this scenario are shown in Appendix C.

<b>Table 9 - Possible operating scenario - GE LM6000 Option</b>				
	Quarter 1 (Hours)	Quarter 2 (Hours)	Quarter 3 (Hours)	Quarter 4 (Hours)
Base Load Only Hours	1,324	1,094	1,247	1,298
Peaking Hours (Duct Firing)	500	321	849	509
Total Base and Peak Hours	1,824	1,415	2,096	1,807
Total Startup Hours	50	83	26	52
Total Operating Hours	1,874	1,498	2,122	1,859
Offline Hours	286	686	86	350
Total Hours in Period	2,160	2,184	2,208	2,208
Number of Hours of Starts (each CTG)				
Hot	14.0	31.0	23.0	19.0
Warm	16.5	19.5	1.0	12.0
Cold	1.0	4.3	0.3	3.0
Total Number of Hours of Starts	31.5	54.8	24.3	34.0
Hours per Start				
Hot	1			
Warm	2			
Cold	3			

Similarly, if other conditions remained the same, PCAPCD estimated the number of hours shown in Table 10 that could achieve the required 31.09 tons per year of NO<sub>x</sub> for the Alstom GX-100 CTGs. The NO<sub>x</sub> emissions from this scenario are shown in Appendix D.

<b>Table 10 - Possible operating scenario - Alstom GX-100 Option</b>				
	Quarter 1 (Hours)	Quarter 2 (Hours)	Quarter 3 (Hours)	Quarter 4 (Hours)
Base Load Only Hours	1,124.9	833.2	1,179.4	1,102.7
Peaking Hours (Duct Firing)	424.8	244.5	803.0	432.6
Total Base and Peak Hours	1,549.7	1,077.7	1,982.4	1,535.3
Total Startup Hours	42.5	63.2	24.6	44.2
Total Operating Hours	1,592.2	1,140.9	2,007.0	1,579.5
Offline Hours	567.8	1,043.1	201.0	628.5
Total Hours in Period	2,160.0	2,184.0	2,208.0	2,208.0
Number of Hours of Starts (each CTG)				
Hot	11.9	23.6	21.8	16.1
Warm	14.0	14.9	0.9	10.2
Cold	0.8	3.3	0.3	2.5
Total Number of Hours of Starts	26.8	41.8	23.0	28.9
Hours per Start				
Hot	1.0			
Warm	2.0			
Cold	3.0			

Note: the hours in tables 9 and 10 are not intended to represent the maximum number of hours of operation of the CTGs or limiting the hours of operation to these levels. These are examples of one method of reducing the quarterly emissions to meet the required NOx limits.

This proposal does not affect the methods of monitoring compliance with permit limits. The hourly emission limits and daily emission limits have not been changed. Only the allowed quarterly levels would be lower for NOx. Compliance with hourly emission limits would be verified by source testing and CEMS data. Compliance with quarterly limits for NOx would be verified by CEMS data. Compliance with limits on other pollutants will be verified by source testing and emission factors.

The permit conditions at the end of this document were revised to reflect the updated NO<sub>x</sub> emissions based upon available NO<sub>x</sub> ERCs.

### **Gas Turbines**

As previously stated, Roseville Electric proposes to install either two Alstom GTX100 gas turbines or two GE LM6000 gas turbines. The emissions from each option are shown in the following tables.

If the Alstom GTX100 turbine are selected the emissions are shown below:

<b>Table 11 - Alstom GTX100 Gas Turbines</b>							
Pollutant	Lbs/hr Max Two Turbine	Lbs/day Max Two Turbines	Quarter 1 (lbs/quarter) Two turbines	Quarter 2 (lbs/quarter) Two Turbines	Quarter 3 (lbs/quarter) Two turbines	Quarter 4 (lbs/quarter) Two Turbines	Tons/ Year Two Turbines
NO <sub>x</sub>	74.2	406.0	15,399	12,965	17,496	15,422	30.64
CO	179.0	629.5	26,787	32,590	28,175	29,862	58.71
VOCs	39.4	223.1	5,791	7,306	6,630	6,848	13.29
PM-10	6.4	211.8	16,300	13,692	17,789	17,569	32.67
SO <sub>x</sub>	1.3	44.0	3,385	2,843	3,694	3,648	6.78

Alternatively, the applicant may select two GE LM6000 turbines and the emissions are as follows:

<b>Table 12 - GE LM6000 Gas Turbines Only</b>							
Pollutant	Lbs/hr Max Two Turbine	Lbs/day Max Two Turbines	Quarter 1 (lbs/quarter) Two Turbines	Quarter 2 (lbs/quarter) Two Turbines	Quarter 3 (lbs/quarter) Two Turbines	Quarter 4 (lbs/quarter) Two Turbines	Tons/year Two Turbines
NO <sub>x</sub>	38.7	268.7	15,399	12,965	17,496	15,422	30.64
CO	28.7	300.8	21,291	18,454	23,160	22,982	42.94
VOCs	3.5	83.6	6,006	5,038	6,555	6,473	12.04
PM-10	9.2	221.6	15,968	13,425	17,410	17,199	32.00
SO <sub>x</sub>	1.9	46.0	3,316	2,788	3,615	3,571	6.65

The maximum hourly emission rates shown are during a cold start of both turbines. The maximum daily emissions were calculated assuming one cold start for 3 hours, one warm start for 1 hour and 19 hours of peak operating with duct burners. Quarterly emissions were calculated as described below:

2 x lbs/hour/turbine @ base load x hours/quarter @ base load +  
 2 x lbs/hour/turbine @ peak load x hours/quarter @ peak load +  
 lbs/start/both turbines during cold start x cold starts/quarter +  
 lbs/start/both turbines during warm start x warm starts/quarter +  
 lbs/start/both turbines during hot start x hot starts/quarter



The emission rates are shown in the applicant's Tables 3.1-12 and 3.1-14 in Appendix C. The hours per quarter are shown in the following table, with the exception that NOx quarterly emission limits have been reduced below the quantity of emissions that would result from these operating hours and will be monitored by the continuous emissions monitor system (CEMS):

<b>Table 13 - Power Plant Gas Turbine Operating Schedule</b>					
	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup></b>	<b>Annual</b>
Base load only hours	1,123	1,188	751	852	3,914
Peaking hours (duct firing)	929	559	1,347	1,246	4,081
Hours of hot starts	25	71	29	42	167
Hours of warm starts	16	40	2	2	60
Hours of cold starts	3	6	3	3	15
Total hours	2,096	1,864	2,132	2,145	8,237

### **Auxiliary Equipment**

#### **Auxiliary Boiler**

The emissions from the auxiliary boiler were manufacturer's data based on CO emissions of 50 ppmv @ 3% O<sub>2</sub> and NOx emissions of 9 ppmv @3% O<sub>2</sub>.

<b>Table 14 – Boiler</b>							
Pollutant	Lbs/hr Max	Lbs/day Max	Quarter 1 (lbs/quarter)	Quarter 2 (lbs/quarter)	Quarter 3 (lbs/quarter)	Quarter 4 (lbs/quarter)	Tons/year
NOx	0.7	16.8	92	372	94	94	0.33
CO	2.2	52.8	311	1,259	317	317	1.10
VOCs	0.3	7.2	36	144	36	36	0.13
PM-10	0.6	14.4	82	332	84	84	0.29
SOx	0.08	1.92	11	46	12	12	0.04

The maximum daily emissions assume 24 hours of operation. The quarterly emissions were based on maximum hourly emissions multiplied by the number of hours per quarter proposed by the applicant. The hours are shown in the following table:

<b>Table 15 – Boiler Operating Schedule (Hours)</b>					
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
Auxiliary Boiler	140	568	143	143	995

### **Cooling Tower**

<b>Table 16 - Cooling Towers</b>							
Pollutant	Lbs/hr Max	Lbs/day Max	Quarter 1 (lbs/quarter)	Quarter 2 (lbs/quarter)	Quarter 3 (lbs/quarter)	Quarter 4 (lbs/quarter)	Tons/year
PM-10	0.68	16.3	1,471	1,487	1,504	1,504	3.0

PM10 emission rates were calculated as follows:

PM10 = cooling water recirculation rate x total dissolved solids concentration in the blowdown water x design drift rate.

### **Emergency Generator**

<b>Table 17 – Emergency Generator – 1,133 Hp Diesel Engine</b>							
Pollutant	Lbs/hr Max	Lbs/day Max	Quarter 1 (lbs/quarter)	Quarter 2 (lbs/quarter)	Quarter 3 (lbs/quarter)	Quarter 4 (lbs/quarter)	Tons/year
NOx	4.31	4.31	54	108	108	108	0.22
CO	0.84	0.84	10	21	21	21	0.04
VOCs	0.16	0.16	2	4	4	4	0.008
PM-10	0.14	0.14	2	3	3	3	0.007
SOx	0.10	0.10	1	2	2	2	0.005

The emergency generator engine calculations assume half load and operations for maintenance and testing for up to 50 hours per year (or 12.5 hours per quarter). These emissions do not include emergency operations.

### **Emergency Fire Pump**

<b>Table 18 – Emergency Fire Pump – 300 hp Diesel Engine</b>							
Pollutant	Lbs/hr Max	Lbs/day Max	Quarter 1 (lbs/quarter)	Quarter 2 (lbs/quarter)	Quarter 3 (lbs/quarter)	Quarter 4 (lbs/quarter)	Tons/year
NOx	1.72	1.72	43	43	43	43	0.086
CO	0.09	0.09	2	2	2	2	0.005
VOCs	0.05	0.05	1	1	1	1	0.002
PM-10	0.03	0.03	1	1	1	1	0.002
SOx	0.19	0.19	1	1	1	1	0.002

The fire pump engine calculations assume full load and operations for maintenance and testing for up to 50 hours per year (or 12.5 hours per quarter). These emissions do not include emergency operations.

### Total Facility Emissions

In summary, the facility emissions are shown in the following tables for each turbine option:

<b>Table 19 - ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM <sub>10</sub>	17,854	15,513	19,378	19,158	35.95
SO <sub>2</sub>	3,400	2,893	3,709	3,663	6.83

<b>Table 20 – GE LM6000 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM <sub>10</sub>	17,523	15,246	18,999	18,788	35.28
SO <sub>2</sub>	3,331	2,838	3,630	3,587	6.69

### XIII. AMMONIA SLIP

The selective catalytic reduction (SCR) system uses ammonia to reduce emissions of nitrogen oxides from the gas turbines. The system operates by combining ammonia, oxygen and nitrogen oxide in the turbine exhaust gas in the presence of a catalyst to form molecular nitrogen and water. In practice not all the ammonia and nitrogen oxide react and are emitted to the atmosphere through the stack. The ammonia emissions are commonly referred to as ammonia slip.

Roseville Electric proposes to install an SCR system with an ammonia slip rate of no greater than 10 ppmv. The application indicates that maximum ammonia emissions rates in pounds per hour are as follows:

<b>Table 21 – Ammonia Emissions</b>		
	Peak (lbs/hour)	Base (lbs/hour)
GE LM6000	9.2	6.3
Alstom GTX100	9.5	6.4

PCAPCD Rule 502, New Source Review, requires Best Available Control Technology (BACT) for a number of regulated pollutants but not for ammonia. The applicant provided a risk assessment which included the ammonia emissions allowed if the ammonia slip is limited to 10 ppmv. The health risk assessment showed an acceptable level of risk under PCAPCD guidelines.

A review of other recent power plant projects indicate ammonia slip limits of 5 or 10 ppmv. The most recent power plant project in the Sacramento Valley Area, SMUD Cosumnes River Project was approved with an ammonia slip limit of 10 ppmv.

The EPA and the Energy Commission comments on the PDOC both recommend an ammonia slip level of 5 ppmv. While PCAPCD agrees with minimizing ammonia emissions, PCAPCD Rules and Regulations do not provide for limiting ammonia slip except to address public health. Accordingly, PCAPCD recommends a permit condition limiting ammonia slip of 10 ppmv based on the applicant's proposal. The Energy Commission may establish a lower limit as a CEQA requirement.

## **IX. OFFSETS**

The PCAPCD Preliminary Determination of Compliance (PDOC) (5/25/04) listed six ERC certificates which had been identified as offsets for emission increases of NOx and PM-10. At the time, the required PM-10 offsets were identified. Sufficient quantities of NOx offsets had not been identified. Identification of the additional offsets required to offset all the emission increases of NOx and PM-10 plus the following information was requested in the PDOC Recommendations as follows:

- A. The ERC certificate number, quantities for each quarter, location of the source of ERCs, distance of source of ERCs from the Roseville Energy Park and offset ratio.
- B. VOC emissions proposed to be traded for NOx will need to be further adjusted by an interpollutant trading ratio. Roseville Electric has proposed a ratio of 2.6. The overall ratio of 5.2 to 1 is higher than used on other power plant projects. Additional modeling will be required to make a final determination unless EPA concurs that a 5.2 overall ratio is acceptable.
- C. The offsets must be summarized in a table showing the amount of offsets provided for each pollutant requiring offsets for each quarter.
- D. For ERCs credited to a stationary source located in another air district than PCAPCD, Roseville Electric must obtain approval from their governing Board of the transfer of ERCs for use in Placer County to

offset the REP. It is our understanding that this Board item is to be heard on June 9, 2004 at Yolo-Solano AQMD.

- E. Roseville Electric must also obtain approval of the PCAPCD Board for the transfer of ERCs for use in Placer County. This Board item is scheduled for June 10, 2004.

Roseville Electric provided two tables, PM-10 for Roseville Energy Park and NOx for Roseville Energy Park, to identify the ERCs available on a quarterly basis. These tables are shown in Appendix C. This satisfies items A and C.

EPA's comments on the PDOC indicated that based upon the small size of the emissions involved, and the high trading ratio proposed, EPA has no objection to the VOC-for-NOx ratio of 5.2 proposed for the Roseville Energy Project. This is based on a VOC for NOx ratio of 2.6 times the offset ratio of 2.0 equals 5.2. This satisfied item B.

Roseville Electric was required to obtain approval of the PCAPCD Board and the Yolo-Solano AQMD Board for the use of ERCs (Calpine Certificates EC-209 and EC-210) credited to a stationary source in Yolo-Solano AQMD pursuant to the California Health and Safety Code Section 40709.6, Offset System. Approval was obtained from the Yolo-Solano AQMD Board on June 9, 2004 and the PCAPCD Board on June 10, 2004. This satisfied items D and E.

All the required PM-10 ERCs were identified. Roseville Electric was unable to identify all the NOx ERCs necessary to offset the NOx emissions of 36.24 tons per year required for the GE turbines or the 39.55 tons per year for the Alstom turbines. As a result, Roseville Electric has requested that the quarterly NOx emissions limits be lowered as discussed previously in the emissions section of this document. Roseville Electric also requested to be allowed to obtain the balance of the NOx reductions from future reductions at Energy 2001, Inc. and the subsequent ERCs or from purchase of ERCs from the SMAQMD Bank or a combination of both.

PCAPCD rules require offsets for emission increases for regulated air pollutants which exceed the trigger levels shown in Rule 502, New Source Review, Section 302, Offset Requirements General. These trigger levels are 7,500 pounds per quarter for NOx, CO, PM-10 and VOCs and 12,500 pounds per quarter for SOx. Offsets are not required under PCAPCD rules for SOx and VOC emissions because they are below the trigger levels. Offsets for CO are not required as the applicant demonstrated by modeling that CO emissions will not cause an increase in ambient concentrations of CO of more than 500 micrograms per cubic meter on an eight hour average at or beyond the property line per PCAPCD Rule 502, New Source Review, Section 302.2.

If the Alstom GX100 turbines are selected for the project, the offsets required using the proposed lower NOx quarterly emissions are shown in the following table:

<b>Table 22 – ALSTOM GX100 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NOx	15,546	13,412	17,646	15,572	31.09
PM-10	17,854	15,513	19,378	19,158	35.95

Similarly, if the GE LM6000 turbines are selected for the project, the offsets required using the proposed lower NOx quarterly emissions are shown in the following table:

<b>Table 23 – GE LM6000 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NOx	15,546	13,412	17,646	15,572	31.09
PM-10	17,523	15,246	18,999	18,788	35.28

### **Proposed offsets**

ERC certificates are issued on a quarterly basis. The proposed source of the emissions reductions for use as offsets and a description of the adjustments which are required prior to using as offsets are discussed in the following paragraphs for each of the certificates. These adjustments are the offset ratio and VOC for NOx interpollutant ratio. Summary tables will be provided.

### **ERCs Purchased from Enron North America**

The City of Roseville has purchased the following ERCs from Enron North America. The certificates were transferred on October 20, 2004.

<b>Table 24 - ERCs Covered by Purchase and Sale Agreement</b>		
PCAPCD Certificate No.	Pollutant	Quantity (tons/year)
2001-23 (reissued as 2004-03)	NOx	10.1
2001-26 (reissued as 2004-05)	VOC	67.0
2001-24 (reissued as 2004-04)	PM-10	29.4
2001-22 (reissued as 2004-02)	PM-10	28.4

### **PCAPCD ERC Certificate 2001-23 (reissued as 2004-03)**

NOx emission reductions were originally issued in ERC Certificate 2001-02 for the 1993 shutdown of the two wood-fired boilers at the Georgia Pacific lumber mill at 23801 Foresthill Road, Foresthill, CA. All operations were shutdown at that time.

NOx emissions were calculated from a source test and averaged over two years. The NOx emissions were RACT/BARCT adjusted to the equivalent 0.052 lbs/MMbtu. The NOx were further reduced by 1.05 to 1 or approximately 5% for the District Priority Reserve. No other additional RACT/BARCT adjustments are required.

This certificate was purchased by Enron North America and reissued as ERC Certificate 2001-23. Roseville Electric has purchased this certificate which has been reissued as ERC 2004-03. The quantities are shown below:

<b>TABLE 25 – ERC Certificate 2001-23 (reissued as 2004-03) Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	5,050	5,050	5,050	5,050	10.1

The reductions occurred approximately 25 miles from the location of the REP. The location is in the Mountain County Air Basin. These ERCs require an offset ratio adjustment of 2.0. The resulting quantities are shown in the following table.

<b>TABLE 26 - ERC Certificate 2001-23 (reissued as 2004-03) NOx Offset Value</b>					
	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
2004-03	2,525	2,525	2,525	2,525	5.05

#### PCAPCD ERC Certificate 2001-26 (reissued as 2004-05)

VOC emission reductions credits were issued in ERC Certificate 2001-05 for the 1993 shutdown of the two wood-fired boilers at the Georgia Pacific lumber mill at 23801 Foresthill Road, Foresthill, CA. All operations were shutdown at that time.

VOC emissions were calculated from a source test and averaged over two years. The VOC emissions were not RACT/BARCT adjusted. RACT or BARCT for VOCs was not identified at the time the ERCs were issued. The VOC emissions were reduced by approximately 5% for the District Priority Reserve. No other additional RACT/BARCT adjustments are required.

This certificate was purchased by Enron North America and reissued as ERC Certificate 2001-26. Roseville Electric has purchased this certificate which has been reissued as ERC 2004-05. The quantities are as follows:

<b>TABLE 27 – ERC Certificate 2001-26 (reissued as 2004-05) Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
VOCs	33,512	33,512	33,512	33,512	67.0

Roseville Electric proposes to use these offsets for an interpollutant trade of VOCs for NOx. The interpollutant trading ratio has been determined to be 2.6 pounds of VOCs to obtain 1 pound of NOx for offsets.

<b>TABLE 28 - ERC Certificate 2000-26 (reissued as 2004-05) After Adjustment for VOC for NOx Offset Interpollutant Trading Ratio</b>					
VOC for NOx	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	12,889	12,889	12,889	12,889	25.8

The reductions occurred approximately 25 miles from the location of the REP. The location is in the Mountain County Air Basin. These ERCs require an offset ratio adjustment of 2.0. The resulting quantities are shown in the following table.

<b>TABLE 29 - ERC Certificate 2000-26 (reissued as 2004-05) VOC for NOx Offset Value</b>					
VOC for NOx	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	6,445	6,445	6,445	6,445	12.9

#### PCAPCD ERC Certificate 2001-22 (reissued as 2004-02)

PM-10 emission reductions were issued in ERC Certificate 2001-20 for the 1996 shutdown of the aggregate handling facility located at 1800 Sunset Blvd. In Rocklin, CA operated by R.C. Collet. The equipment included grizzlies, screens, crushers, stackers and conveyors. All aggregate operations were shutdown at that time.

The historical emissions from the operations were calculated using AP-42, Fourth Edition. Emissions from these operations were controlled by water sprays on transfer points and watering of unpaved roads. The control efficiency of the water sprays were considered in the calculation of the ERCs to be 90%. Additional RACT or BARCT for PM-10 was not identified at the time the ERCs were issued.

This certificate was purchased by Enron North America and reissued as ERC Certificate 2001-22. Roseville Electric has purchased this certificate which has been reissued as ERC 2004-02. The quantities are shown below:



<b>TABLE 30 – ERC Certificate 2001-22 (reissued as 2004-02) PM-10 Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
PM-10	2,578	22,263	16,085	15,916	28.4

Only a portion of this certificate can be used to offset PM-10 emissions. The amount to be used for the Alstom Turbine option is shown in the following table:

<b>TABLE 31a – ERC Certificate 2001-22 (reissued as 2004-02) PM-10 Face Value to be Used for Alstom Turbine Option</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
PM-10	2,578	20,167	16,085	15,916	27.37

The amount to be used for GE Turbine option is shown in the following table:

<b>TABLE 31b – ERC Certificate 2001-22 (reissued as 2004-02) PM-10 Face Value to be Used for GE Turbine Option</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
PM-10	2,578	19,820	16,085	15,916	27.20

The reductions occurred approximately 7 miles from the location of the REP. The location is in the District and in the Sacramento Valley Air Basin. These ERCs require an offset ratio adjustment of 1.3. The resulting quantities are shown in the following tables.

<b>TABLE 32a – ERC Certificate 2001-22 (reissued as 2004-02) PM-10 Offset Value to be Used for the Alstom Turbine Option</b>					
PM-10	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	1,983	15,513	12,373	12,243	21.06

<b>TABLE 32b – ERC Certificate 2001-22 (reissued as 2004-02) PM-10 Offset Value to be Used for the GE Turbine Option</b>					
PM-10	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	1,983	15,246	12,373	12,243	20.92

#### PCAPCD ERC Certificate 2001-24

PM-10 emission reductions were issued in ERC Certificate 2001-03 for the 1993 shutdown of the two wood-fired boilers and the sawmill at the Georgia Pacific lumber mill at 23801 Foresthill Road, Foresthill, CA. All operations were shutdown at that time.

Emissions from the two boilers were calculated utilizing source test data and averaged over two years. The PM-10 emissions were controlled by a large cyclone. The cyclone was considered RACT/BARCT. PM-10 emissions were not RACT/BARCT adjusted. The emissions from the sawmill were calculated from AP-42 emission factors and production records. Additional RACT or BARCT for PM-10 from the sawmill was not identified at the time the ERCs were issued. The PM-10 emissions were reduced by approximately 5% for the District Priority Reserve. No other RACT/BARCT adjustments are required.

This certificate was purchased by Enron North America and reissued as ERC Certificate 2001-24. The quantities issued were 50,676 pounds per quarter for each quarter or 101.3 tons per year. Roseville Electric has purchased the following quantities from this certificate. The amount owned by Roseville Electric has been reissued in certificate 2004-04 and the balanced returned to Enron North America was reissued in certificate 2004-06.

Alstom Turbine

This certificate will be used in entirety for the Alstom Turbine option.

<b>TABLE 33a – Purchase of a Portion of ERC Certificate 2001-24 (Reissued as 2004-04) – PM-10 Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
PM-10	22,680	-	13,440	22,680	29.4

The reductions occurred approximately 25 miles from the location of the REP. The location is in the Mountain County Air Basin. These ERCs will require an offset ratio adjustment of 2.0. The resulting quantities are shown in the following table:

<b>TABLE 33b - ERC Certificate 2001-24 (reissued as 2004-06) PM-10 Offset Value</b>					
PM-10	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	11,340	0	6,720	11,340	14.7

If the Alstom turbine option is selected, PM10 offsets will be obtained from the certificate 2001-24 and an additional amount must be obtained from certificate 2001-24 (reissued as 2004-06). Note: there were not sufficient ERCs to match each quarterly requirement. After purchase of these ERCs, there will be extra PM-10 ERCs in the 2<sup>nd</sup> quarter in the amount of 2,096 pounds.

<b>TABLE 33c - ERC Certificate 2001-24 (reissued as 2004-06) Additional PM-10 for Alstom Option</b>					
PM-10	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	362	0	420	0	0.39

<b>TABLE 33d - ERC Certificate 2001-24 (reissued as 2004-06) Additional PM-10 Offset Value (for Alstom Option)</b>					
PM-10	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	181	0	210	0	.196

#### GE Turbine

If the GE turbine option is selected, PM10 offsets will be obtained from the certificate 2001-24 as shown in the following tables:

<b>TABLE 34 – Purchase of a Portion of ERC Certificate 2001-24 (Reissued as 2004-04) – PM-10 Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
PM-10	22,680	-	13,440	22,680	29.4

The quantity of ERCs needed from this certificate is shown in the following table.

<b>TABLE 34 – Purchase of a Portion of ERC Certificate 2001-24 (Reissued as 2004-04) – PM-10 Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
PM-10	22,680	-	13,252	21,490	29.4

The reductions occurred approximately 25 miles from the location of the REP. The location is in the Mountain County Air Basin. These ERCs will require an offset ratio adjustment of 2.0. The resulting quantities are shown in the following table:

<b>TABLE 34a - ERC Certificate 2001-24 (reissued as 2004-06) PM-10 Offset Value</b>					
PM-10	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	11,340	0	6,626	10,745	14.7

If the Alstom turbine option is selected, PM10 offsets will be obtained from the certificate 2001-24 as shown in Tables 33 and 34a and an additional amount must be obtained from certificate 2001-24 (reissued as 2004-06). Note: there were not sufficient ERCs to match each quarterly requirement. After purchase of these ERCs, there will be extra PM-10 ERCs in the 2<sup>nd</sup> quarter in the amount of 2,096 pounds.

<b>TABLE 34b - ERC Certificate 2001-24 (reissued as 2004-06) Additional PM-10 for Alstom Option</b>					
PM-10	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	362	0	420	0	0.39

<b>TABLE 34c - ERC Certificate 2001-24 (reissued as 2004-06) Additional PM-10 Offset Value (for Alstom Option)</b>					
PM-10	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	181	0	210	0	.196

### **Calpine Corporation ERCs**

Roseville Electric released a letter on May 4, 2004 indicating they have completed negotiations with Calpine Corporation for the purchase of 12.37 tons of NOx ERCs. A copy of the option agreement has been submitted to the PCAPCD. These ERCs were issued in two certificates EC-209 and EC-210 by the Yolo-Solano Air Quality Management District (YSAQMD).

#### **YSAQMD EC-209**

The District has reviewed the documents on these ERCs provided by YSAQMD. The original ERC Certificate EC-8393-94-01 was issued for the shutdown of the beet pulp process at the former Delta Sugar Plant located at the intersection of River Road and Willowpoint Road in Clarksburg. The equipment included one 120 MMBtu/hr dryer (also called a dehydrator) dual fired on natural gas and woodwaste and five (5) 174 hp, natural gas fired rich burn engines. The amount of NOx ERCs issued initially were 903 pounds in Quarter 1, 74,926 pounds in Quarter 2, 23,928 pounds in Quarter 3, and 31,141 pounds in Quarter 4.

ARB provided written comments suggesting that the emissions from the engines were not BARCT adjusted as required by YSAQMD Rule 3.14. Subsequently YSAQMD issued the ERC Certificate with an advisory that these emission reduction credits may be subjected to an adjustment as required by Federal, State and District policies and regulations at the time of use.

The BARCT adjustment was made at the time a portion of the ERCs in Certificate EC-8393-94-01 were transferred to Calpine Corporation in April, 1999. The NOx reductions attributed to the five engines were adjusted from an emission level of 1235 ppmv @15% O2 to 25 ppmv @ 15% O2. After this adjustment, Certificate EC-0060 was issued for NOx in the amount of 328 pounds in Quarter 1, and 27,237 pounds in Quarter 2, 8,698 pounds in Quarter 3, and 11,320 pounds in Quarter 4.

Certificate EC-0060 was split into two certificates so that Calpine Corporation could surrender a portion of the ERCs to the Feather River AQMD. The balance of the NOx ERCs were issued in Certificate EC-209 for the amount of 20,588 pounds in Quarter 2, and 3,542 pounds in Quarter 4.

The NOx ERCs in EC-209 have been reissued in Certificate EC-238 for the same amounts of 20,588 pounds in quarter 2 and 3,542 in quarter 4. The new certificate was issued because of a transfer of VOC ERCs from Calpine Corporation to Leer West.

Roseville Electric is proposing to utilize the following quantities from a portion of EC-238. Roseville Electric has provided the PCAPCD with a copy of the option agreement for these ERCs.

<b>TABLE 35a – YSAQMD Certificate EC-238 (From EC-209) - NOx Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	0	6,888	0	3,542	5.22

The Yolo-Solano AQMD Board approved the transfer of these ERCs for use as offsets in Placer County provided 10 percent were held back and made available for sale in Yolo-Solano. The available ERCs from this certificate are as follows:

<b>TABLE 35b – YSAQMD Certificate EC-238 (From EC-209) - NOx Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	0	6,199	0	3,187	4.69

The reductions occurred approximately 35 miles from the location of the REP. The location is outside of the PCAPCD and in the Sacramento Valley Air Basin. These ERCs will require an offset ratio adjustment of 2.1. The resulting quantities are shown in the following table:

<b>TABLE 36 - YSAQMD Certificate EC-238 (From EC-209) - NOx Offset Value</b>					
	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	0	2,952	0	1,518	2.24

## YSAQMD EC-210

Emission reduction credits for NOx were originally issued in ERC Certificate EC-8693-94-01 by YSAQMD for the 1993 shutdown of a lime kiln operation at the Delta Sugar Plant located at the intersection of River Road and Willowpoint Road in Clarksburg, CA.

The calculations utilized the average tons of coke burned in the lime kiln and AP-42 emission factors to calculate NOx and other emissions. A RACT adjustment was not applied to the emissions.

The original certificate was issue for the following amounts of NOx: Quarter 1: 128 lbs, Quarter 2: 10,620 lbs, Quarter 3: 3,392 lbs and Quarter 4: 4,414 lbs. The ERCs for the 1<sup>st</sup> and 3rd quarter were surrendered to the Feather River AQMD for Calpine's Sutter Project. The balance was reissued to Calpine Corporation in Certificate EC-210 for the amounts shown below:

<b>TABLE 37a – YSAQMD Certificate EC-210 – NOx Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	0	10,620	0	4,414	7.52

The reductions occurred approximately 35 miles from the location of the REP. The location is outside of the PCAPCD and in the Sacramento Valley Air Basin.

The Yolo-Solano AQMD Board approved the transfer of these ERCs for use as offsets in Placer County provided 10 percent were held back and made available for sale in Yolo-Solano. The available ERCs from this certificate are as follows:

<b>TABLE 37b – YSAQMD Certificate EC-210 – NOx Available Face Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	0	9,558	0	3973	6.77

The reductions occurred approximately 35 miles from the location of the REP. The location is outside of the PCAPCD and in the Sacramento Valley Air Basin. These ERCs require an offset ratio adjustment of 2.1. The resulting quantities are shown in the following table.

<b>TABLE 38 - YSAQMD Certificate EC-210 NOx Offset Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	0	4,551	0	1,892	3.22

### Additional NOx ERCs

A review of these certificates indicated the necessary offsets for PM-10 are available. Additional ERCs to offset the NOx emissions are required. Roseville Electric proposes to provide additional NOx ERCs.

In the PDOC, we discussed Roseville Electric's proposal to obtain additional ERCs in Placer County from two sources, Energy 2001 and the Union Pacific Railyard. The proposal to obtain ERCs from the Union Pacific Railyard has been dropped by Roseville Electric.

The other source from which Roseville Electric has proposed ERCs is Energy 2001. This facility is located at 3195 Athens Avenue at the Western Regional Landfill near Roseville. Energy 2001 has a permit to operate a landfill gas engine. Energy 2001 has recently obtained an Authority to Construct to replace the one engine with two engines.

Roseville Electric is proposing to install additional control equipment to reduce NOx emissions and obtain NOx ERCs in the amount of up to 10 tons per year. At an offset ratio of 1.3, this could offset 7.69 tons of NOx.

<b>TABLE 39 - Energy 2001 - Proposed ERCs</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	5,300	5,300	5,250	4,150	10.0

<b>TABLE 40 - Energy 2001- Proposed ERCs NOx Offset Value</b>					
Pollutant	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
NOx	4,077	4,077	4,038	3,192	7.69

In the PDOC, the PCAPCD raised concerns that this facility had not operated recently and did not have historical actual emissions. The equipment consisted of one, 1966 era, diesel engine modified to run on landfill gas with small quantities of diesel injection.

There was a change of ownership last year. The new owner replaced the one, older existing engine with two brand new landfill gas fired engines this summer. They began commercial operation in early September. Each engine is a spark ignited, 1148 horsepower, Caterpillar, Model Number G3615. The generators are each nominally rated at 800 KW. The landfill gas is treated by a gas conditioning

skid prior to the engines. The skid is manufactured by LFG Specialties and includes demisters, condensate knockout tanks and carbon filters.

The new equipment removes our major concerns about the ability of the facility to operate continuously. Energy 2001 proposes to operate the landfill gas engines to establish historical actual emissions. They estimate NO<sub>x</sub> levels of 6,700 pounds per quarter to 10,000 pounds per quarter. Subsequently, up to 90% reduction of NO<sub>x</sub> emissions are proposed from the installation of a selective catalytic reduction (SCR) system on each engine.

For example, if the historical actual emissions were established at 6,700 pounds per quarter, the emission reductions, assuming 90% control, would equal 6,030 pounds per quarter or 12.06 tons per year (tpy). The emission reduction credits would have a value of 6,030/1.05 or 5,743 pounds per quarter (11.5 tpy).

Appendix H, Energy 2001 – Emission Reduction Credit Proposal, contains a detailed discussion on the technical and regulatory issues that which need to be addressed to achieve NO<sub>x</sub> reductions and obtain the proposed NO<sub>x</sub> ERCs. The Energy 2001 proposal to obtain ERCs involves some uncertainty, particularly the cleanup of the landfill gas sufficiently to allow operation of an SCR system. An SCR system has not been applied to landfill gas engines in the past because of the high cost associated with pretreating the gas. However, several U.S. EPA demonstration projects using landfill gas with fuel cells that also have a catalyst which requires very clean gas does indicate there is technology available and cleanup is feasible.

The Energy 2001 ERC proposal appears feasible. As with any ERCs, the burden is on the applicant to demonstrate the reductions and meet all regulatory requirements necessary to obtain ERCs. The reductions must be maintained for the life of the project using the ERCs for offsets or the ERCs will be invalidated.

There are benefits to using the proposed reductions from Energy 2001 to offset the REP. Energy 2001 is located approximately 4 miles from the REP site. If ERCs were obtained, the amount of NO<sub>x</sub> emissions allowed would be .769 tons increase in potential emissions per 1.0 ton of actual reductions. As far as timing goes, emission reductions would occur close to, but prior to, the time the REP would begin operation. This would more closely represent a real-time or concurrent offset compared to use of ERCs from older plant shutdown.

Roseville Electric has further requested to be allowed to obtain the 10 tons of NO<sub>x</sub> emission reductions utilizing either the Energy 2001, Inc. ERCs or by purchasing NO<sub>x</sub> ERCs from the Sacramento Metropolitan Air Quality Management District (SMAQMD) Bank or a combination of both.

The SMAQMD Bank does have the proposed quantities of ERCs. Roseville Electric would have to submit an application to SMAQMD and obtain approval of



both the purchase of ERCs and the transfer of ERCs to another air district. Roseville Electric would also have to obtain the approval of the PCAPCD Board for transfer of ERCs. ERCs from SMAQMD were generated approximately 17 miles from the REP. An offset ratio of 2.1 to 1.0 is required because they were generated greater than 15 miles from the REP but within 50 miles and outside the District but in the same air basin per PCAPCD Rule 502, New Source Review, Section 303.1.

Although there are issues with both the proposed Energy 2001 ERCs and the purchase of ERCs from the SMAQMD Bank, the combination of the two provide more assurance that offsets be available prior to commencing operation as required by PCAPCD Rules and Regulations.

The PCAPCD concludes this proposal meets both PCAPCD and federal requirements provided the ERCs are surrendered at least prior to commencing operation. We recommend that the existing listed ERC Certificates be purchased by Roseville Electric and surrendered prior to start of construction and the Energy 2001 reductions or ERCs purchased from the SMAQMD Bank be surrendered at least 30 days prior to commencing operation.

<b>Table 41 – NOx ERCs Offset Value Summary</b>						
<b>NOx</b>	<b>District/ Certificate #</b>	<b>Quarter 1 (lbs)</b>	<b>Quarter 2 (lbs)</b>	<b>Quarter 3 (lbs)</b>	<b>Quarter 4 (lbs)</b>	<b>Annual (Tons)</b>
Roseville Electric	PCAPCD/ 2001-23 (2004-03)	2,525	2,525	2,525	2,525	5.05
Calpine Corp.	YSAQMD/ EC-209 (EC-238)	0	2,952	0	1,518	2.24
Calpine Corp.	YSAQMD/ EC-210	0	4,551	0	1,892	3.22
Roseville Electric	PCAPCD/ 2001-26 (2004-05)	6,445	6,445	6,445	6,445	12.9
Energy 2001/ SMAQMD Bank		4,077	4,077	4,038	3,192	7.69
Total NOx Offsets Value		13,047	20,550	13,008	15,572	31.09
NOx after transfer from Q2 to Q1 and Q3 *		15,547	13,412	17,646	15,573	31.09

Proposed NOx Potential to Emit To Be Offset		15,547	13,412	17,646	15,573	31.09
* The NOx ERCs obtained from emission reductions in the 2 <sup>nd</sup> and 3 <sup>rd</sup> quarters may be used to offset NOx emissions during any quarter of the year per PCAPCD Rule 502, New Source Review, Section 302.7. REP proposes to transfer 2,500 pounds of NOx from quarter 2 to quarter 1 and 4,638 pounds of NOx from quarter 2 to quarter 3. The amount of offsets available is sufficient to cover the proposed potential to emit.						

The PM-10 offsets to be provided for the Alstom Turbines are shown below after the offset ratio was applied.

Table 42 a – PM-10 ERCs Offset Value Summary – Alstom Turbines							
PM-10	District/ Certificate #		Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
Roseville Electric	PCAPCD/ 2001-24 (2004-04)		11,340	0	6,720	11,340	14.70
Roseville Electric	PCAPCD/ 2001-22 (2004-05)		1,983	15,513	12,373	12,243	21.06
Enron	2001-24 (2004-06)		181	0	210	0	0.20
<b>PM-10</b>	<b>TOTALS</b>		13,504	15,513	19,303	23,583	35.95
PM-10 after transfer from between quarters *			17,854	15,513	19,378	19,158	39.95
PM-10 Potential to Emit to be offset			17,854	15,513	19,378	19,158	39.95
*PM-10 ERCs obtained from emission reductions in the 1st and 4th quarters may be used to offset PM-10 emissions during any quarter of the year per PCAPCD Rule 502, New Source Review, Section 302.8. REP proposes to transfer 4,350 pounds of PM-10 from quarter 4 to quarter 1 and 75 pounds of PM-10 from quarter 4 to quarter 3. The amount of offsets available is sufficient to cover the proposed potential to emit.							

The PM-10 offsets to be provided for the GE Turbines are shown in the following after the offset ratio was applied.

Table 42 b – PM-10 ERCs Offset Value Summary – GE Turbines							
PM-10	District/ Certificate #		Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
Roseville Electric	PCAPCD/ 2001-24 (2004-04)		11,340	-	6,626	10,745	14.36
Roseville Electric	PCAPCD/ 2001-22 (2004-05)		1,983	15,246	12,373	12,243	20.92
<b>PM-10</b>	<b>TOTALS</b>		13,323	15,246	18,999	22,988	35.28
PM-10 after transfer from between quarters *			17,523	15,246	18,999	18,788	35.28
PM-10 Potential to Emit to be offset			17,523	15,246	18,999	18,788	35.28
* PM-10 ERCs obtained from emission reductions in the 1st and 4th quarters may be used to offset PM-10 emissions during any quarter of the year per PCAPCD Rule 502, New Source Review, Section 302.8. REP proposes to transfer 4,200 pounds of PM-10 from quarter 4 to quarter 1. The amount of offsets available is sufficient to cover the proposed potential to emit.							

The shifting of ERCs into other quarters is also shown in the tables of Appendix E. These tables indicate the proposed offsets meet the requirements to offset emission increases on a quarterly basis of 31.09 tons per year of NO<sub>x</sub> for either turbine options and 35.28 tons per year of PM-10 for the GE turbines option or 35.95 tons per year of PM-10 for the Alstom option.

#### Interpollutant Offsets

An interpollutant offset is the use of ERCs of one pollutant to offset the increase in emissions of another pollutant. PCAPCD Rule 502, New Source Review, Section 304, allows the PCAPCD Air Pollution Control Officer to approve interpollutant offsets for precursor pollutants.

**304 INTERPOLLUTANT OFFSETS:** The Air Pollution Control Officer may approve interpollutant offsets for precursor pollutants on a case by case basis, provided that the applicant demonstrates through the use of an air quality model that the emission increases from the new or modified source will not cause or contribute to a violation of an ambient air quality standard. In such cases, the Air Pollution Control Officer shall impose, based on an air quality analysis, offset ratios greater than the requirements of Section 303. Interpollutant offsets between PM10 and PM10 precursors may be allowed only if PM10 precursors contribute significantly to the PM10 levels that exceed the PM10 ambient standards. PM10 emissions shall not be allowed to offset nitrogen oxides or reactive organic compound emissions in ozone nonattainment areas, nor be allowed to offset sulfur oxide emissions in sulfate nonattainment areas.

PCAPCD has reviewed interpollutant offsets ratios used for power plants in other districts in California. The following VOC for NOx interpollutant offsets were identified:

<b>Table 43</b>		
<b>Interpollutant Trade Ratios Used for Power Plants in Other Districts</b>		
<b>District</b>	<b>Project</b>	<b>VOCs for NOx Ratio</b>
Bay Area Air Quality Management District	Delta Energy	1:1
Mojave Air Quality Management District	High Desert	1.6:1
Monterey Air Quality Management District	Moss Landing	1:1
Mojave Air Quality Management District	Blythe	1.6:1
Bay Area Air Quality Management District	Metcalf	1:1
San Louis Obispo Air Pollution Control District	Morro Bay	1:1
South Coast Air Quality Management District	Mountainview	1:1
San Diego Air Quality Management District	Otay Mesa	2:1
Bay Area Air Quality Management District	Valero	1:1
Sacramento Municipal Air Quality Management District	Consumnes Power Plant Project	2.6:1

Although not shown in the table, SMUD has utilized a 2.0 interpollutant trading for other projects in the Sacramento area.

The ARB Guidance for Power Plant Siting and Best Available Control Technology (7-22-99) was reviewed in considering the proposed interpollutant trading ratio. Page 10, Table I-3, Minimum Interpollutant Offset Ratios, recommended the minimum ratio should be basin specific and no less than 1.0:1. Page 11, Table I-4, Minimum Interbasin Offset Ratios, indicate the minimum offset ratio for offsets within 50 miles should be 2.0 to 1.

Interpollutant offsets were not discussed in the application for the REP. During later discussions concerning offsets, Roseville Electric has proposed the use of interpollutant offsets of VOCs for NOx. VOCs and NOx are considered precursors to ozone formation. This may be allowed under Section 304 provided the applicant demonstrates through the use of an air quality model that the emission increase from the new or modified source will not contribute to a violation of an ambient air quality standard.

Roseville Electric's proposal for determining an interpollutant trading ratio is shown in Appendix F. Roseville Electric has proposed to establish the interpollutant offset ratio by utilizing the modeling and analysis performed for the Sacramento Municipal Utility District (SMUD) Consumnes River Project which was approved by the Energy Commission in 2003.

Roseville Electric provided the Sacramento Metropolitan Air Quality Management District (SMAQMD) Final Determination of Compliance, Consumnes Power Plant (October 21, 2002) to the PCAPCD for reference. Appendix B-1 of the Consumnes Power Plant PDOC, VOC for NOx Interpollutant Trade Analysis, describes the analysis performed for this power plant.

The Consumnes Power Plant (CPP) project consists of four combined cycle gas turbines with a nominal output of 1,060 megawatts. The project will be built in two phases. Offsets have been provided for the first phase. These offsets included interpollutant trading of VOC for NOx and SOx for PM-10. The Consumnes Power Plant project is on a site approximately ½ mile south of the Rancho Seco Nuclear Power Plant which is being decommissioned. It is located in Township 6N, Range 9E, Section 29 in the Sacramento Valley Air Basin approximately 25 miles southeast of the City of Sacramento in Sacramento County and 35 miles south of the Roseville Energy Park. The Consumnes project elevation is 160 feet above sea level.

A number of interpollutant analyses were performed for the CPP. These included (1) Urban Airshed Modeling (UAM) by Systems Application International (SAI), (2) Federal Implementation Plan (FIP) Diagram based on EPA UAM Results, (3) State Implementation Plan (SIP) UAM EKMA Diagram from 1994 SIP, (4) Extent of Reaction Analysis (Charles Blanchard's), (5) Ambient NOx, NMHC and Ozone Relationships (Sierra Research Analysis) and (6) SIP UAM Modeling Performance Evaluation (ARB) and PAMS data analysis (SMAQMD).

These analyses showed a variety of indications of interpollutant ratios, ranging from 0.2 to 1 to 50 to 1.

Ultimately the interpollutant ratio for the CPP was based on the average of the SAI UAM results shown in the following from page 118 of the SMAQMD FDOC.

<b>Table 44 - Consumnes Power Plant, VOC to NOx Ratios, SAI UAM</b>						
Measure	July 12			July 13		
1-hr ozone peak	---	---	1	---	---	1.0
Max change in 1-hr ozone	1.0	1.2	1.9	1.7	2.0	1.4
8-hr ozone peak	---	---	---	---	---	1.0
Max. change in 1-hr ozone	3.2	1.4	2.3	7.9	2.3	1.4
VOC to NOx Ratio Average = 2.0						

The final interpollutant ratio was increased by 30% to take into account uncertainties in the modeling and other analysis. The interpollutant trading ratio was set at  $2.0 + 2.0 \times 0.30$  or 2.6. SMAQMD also applied an offset ratio of 1.3 resulting in an overall VOC for NOx ratio of 3.9 to 1.

Roseville Electric is proposing to use the determined interpollutant trading ratio of 2.6 to 1. The PCAPCD offset ratio of 2.0 to 1 for offsets generated more than 15 miles but within a 50 mile radius will apply to most of the VOC for NOx interpollutant trading. The resulting overall VOC for NOx ratio will be 5.2.

District staff discussed this issue with Mr. Mark Sims, Environmental Engineer, U.S. EPA Region IX. Mr. Sims indicated the proposed offset ratio is acceptable. See Appendix I, Comments Letters Received by District on PDOC.

The PCAPCD concludes that the proposed interpollutant trading ratio of 2.6 to 1 is equal to or higher than those found on other projects and the resulting overall ratio of 5.2 is considerably higher than used on other projects.

## **X. AIR MODELING**

Modeling was performed by the applicant to analyze the impacts of the project on ambient air quality using an approved regulatory modeling program, Industrial Source Complex Short Term, ISCST3. The emission rates used as input in the modeling were based on the worst case or highest emissions for each pollutant for each of two turbine manufacturers.

The turbine emissions were revised and resubmitted to the District on April 9, 2004. The new emissions estimates were revised downward with the most significant change being reduced CO and VOC emission rates from the Alstom turbines. Emissions were not revised for the GE CTGs. Modeling has not been resubmitted as the revised emissions would produce impacts that are less than those listed in the following tables. The current modeling used the prior higher emission estimates for the Alstom CTGs and can be used conservatively to estimate the maximum impacts.

TABLE 45 - GE LM600 MODELING RESULTS COMPARED TO CAAQS AND NAAQS						
Pollutant	Averaging Period	Background Concentration (µg/m <sup>3</sup> )	ISCST3 Modeled Impact (µg/m <sup>3</sup> )	Predicted Total Concentration (µg/m <sup>3</sup> )	CAAQS (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )
NO <sub>2</sub>	1-hour	161.8	275.76	437.56	470	-
	Annual	32.0	0.99	32.99	-	100
CO	1-hour	5269.8	377.12	5,46.92	23,000	40,000
	8-hour	3551.4	126.06	3,677.46	10,000	10,000
PM <sub>10</sub>	24-hour	93.0	16.68	109.68	50	150
	Annual	25.0	0.48	25.48	20	50
SO <sub>2</sub>	1-hour	49.8	49.88	99.68	650	-
	3-hour	31.4	9.30	40.70	-	1300
	24-hour	28.8	2.33	31.13	109	365
	Annual	5.2	0.733	5.93	-	80

TABLE 46 - ALSTOM GTX100 MODELING RESULTS COMPARED TO CAAQS AND NAAQS						
Pollutant	Averaging Period	Background Concentration (µg/m <sup>3</sup> )	ISCST3 Modeled Impact (µg/m <sup>3</sup> )	Predicted Total Concentration (µg/m <sup>3</sup> )	CAAQS (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )
NO <sub>2</sub>	1-hour	161.8	275.77	437.57	470	-
	Annual	32.0	1.00	33.00	-	100
CO	1-hour	5269.8	377.12	5646.92	23,000	40,000
	8-hour	3551.4	134.13	3685.53	10,000	10,000
PM <sub>10</sub>	24-hour	93.0	16.68	109.68	50	150
	Annual	25.0	0.48	25.48	20	50
SO <sub>2</sub>	1-hour	49.8	49.88	99.68	650	-
	3-hour	31.4	9.3	40.70	-	1300
	24-hour	28.8	2.33	31.13	109	365
	Annual	5.2	0.73	5.93	-	80

The modeling indicates that the project would not cause an exceedence of federal National Ambient Air Quality Standards (NAAQS) for NO<sub>2</sub>, CO, PM-10 and SO<sub>2</sub>. The modeling indicates that the project would not cause an exceedence of state California Ambient Air Quality Standards (CAAQS) for NO<sub>2</sub>, CO, and SO<sub>2</sub>.

Placer County is currently designated non-attainment for PM-10 for state standards. The results of modeling PM-10 impacts indicate a maximum impact of 16.68 µg/m<sup>3</sup> (24-hour) and 0.48 µg/m<sup>3</sup> (annual). While the facility may not cause additional violations, these impacts are significant because the area is currently exceeding state standards for PM-10 and the impact is approximately 33% of the state standard.

CARB has adopted an annual standard of 12  $\mu\text{g}/\text{m}^3$  for fine particulates less than 2.5 microns (PM-2.5). The PM-10 emissions are from combustion sources. These are believed to be primarily fine particulates less than 2.5 microns. Using the modeling for PM-10, PCAPCD concludes that the estimated PM-2.5 impacts are 0.48  $\mu\text{g}/\text{m}^3$ . Background concentrations have not yet been determined.

## **XI. HEALTH RISK ASSESSMENT**

A health risk assessment was performed by the applicant for the proposed project. The results are summarized in the following table:

<b>Table 46 - HEALTH RISK ASSESSMENT SUMMARY</b>	
Maximum Excess Cancer Risk	0.0743 per million
Acute Inhalation Hazard Index	0.478
Chronic Inhalation Hazard Index	0.011

### Excess Cancer Risk

The CARB Risk Management Guidelines for New and Modified Sources of Toxic Air Pollutants (7/93) recommends that districts use an excess cancer risk of 1 per million as the point at which Toxic Best Available Control Technology (T-BACT) is required. They further suggest 10 in a million as the upper level cancer risk for discretionary permitting decisions and a value of 100 in a million as the upper level for all permitting decisions.

The increased cancer risk does not exceed one in one million.

### Hazard Index

The estimate of non-cancer health effects is expressed as the ratio of estimated ambient concentration of a substance to the acceptable exposure level. This ratio is called the Hazard Index. The acute hazard index relates to short term exposure. The chronic hazard index relates to long term exposure.

The CARB document suggests setting a total hazard index value of 1 as the upper limit for non-discretionary permitting decisions and 10 as the maximum for all permitting decisions.

The health risk assessment performed indicates a hazard index of less than one which is acceptable under current guidelines.

## **XII. COMPLIANCE WITH DISTRICT RULES AND REGULATIONS**

The PCAPCDs review determined the following Rules and Regulations were applicable to the project and are considered in this evaluation of this project.



## RULE 102 DEFINITIONS

Rule 102, Definitions, contains the definitions of terms used in the Placer County APCD Rules and Regulations. For example, included are the definitions of volatile organic compounds and exempt compounds (exempt from the definition of VOC) and standard conditions (60 degrees Fahrenheit and 14.7 pounds per square inch absolute). These definitions apply unless other specific definitions are contained in the individual rules.

## RULE 202 VISIBLE EMISSIONS

Rule 202, Visible Emissions, prohibits discharge of an air contaminant from any single source for a period or period aggregating more than three (3) minutes in any hour which is as dark or darker than No. 1 on the Ringlemann or the equivalent opacity (20%). Aggregating means the periods of the exceedences are added during the hour to determine compliance.

The exclusive use of natural gas as fuel for the CTGs is expected to minimize visible emissions. Visible emissions, excluding uncombined water vapor, are not expected to exceed Ringlemann No. 1. The cooling towers are not expected to have visible emissions, excluding uncombined water vapor, greater than 20% opacity.

The emergency generator and the fire pump are driven by diesel engines. Diesels may smoke when first started if the engine is cold. However, a properly maintained diesel engine will not cause visible emissions greater than Ringlemann No. 1 for more than (3) minutes in any one hour.

Compliance is expected.

## RULE 204 WET PLUMES

When uncombined water is the only reason for failure to meet the requirements of Rule 202, Visible Emissions, the limitations of Rule 202 do not apply. This rule applies the cooling towers.

Compliance with this rule is expected.

## RULE 205 NUISANCE

Rule 205, Nuisance, prohibits the discharge of air contaminants which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the health and safety of those persons or the public.

Proper operation of the equipment with air pollution controls is not expected to create a nuisance.

As previously discussed, a health risk assessment was performed by the applicant for the project. The cancer risk does not exceed one in one million. The acute and chronic hazard indexes do not exceed 1. A health index of 1 is the maximum a source should be allowed to contribute to the existing background risk. The indices are less than one.

A nuisance is not anticipated and will be prohibited by a permit condition.

## RULE 209 FOSSIL FUEL-STEAM FACILITY

Rule 209, Fossil Fuel-Steam Facility limits the emissions of sulfur oxides to 200 pounds per hour, nitrogen oxides to 140 pounds per hour and combustion contaminants to 10 pounds per hour from any fossil fired steam generating plant (as defined in Rule 102, Definitions).

Rule 102, Definitions, Section 226, Fossil Fuel, lists natural gas as a fossil fuel. Section 227, Fossil Fuel Fired Steam Generator, defines a fossil fuel-fired steam generator as "a furnace or boiler used in the process of burning fossil fuel for the primary purpose of producing steam by heat transfer. "

Each of the CTG/HRSG units produce electricity by three means: (1) momentum transfer from the gas turbine engine exhaust gasses to the power output shaft via the turbine blades, (2) indirect heat transfer from the turbine exhaust gases (after the turbine vanes) to water and steam tubes in the HRSG which produces steam which passes through a steam turbine/generator, and (3) duct firing within the HRSG to raise the temperature of the exhaust gases to transfer additional heat to the water and steam tubes in the HRSG producing additional steam generating more power in the steam turbine/generator. Under average ambient conditions, 86 to 94 MW are produced directly by the CTGs and 30 to 88 MW are produced indirectly by the HRSG (depending upon level of HRSG duct firing).

The CTG/HRSG equipment meets the definition of fossil fuel-steam generator because they produce a significant portion of the power through heat transfer. Rule 209, Fossil Fuel-Steam Facility, applies to the CTG/HRSG.

This rule also applies to the auxiliary boiler. The boiler emissions are below the required emission levels. Compliance with this rule is expected.

The calculated emissions are below the required emission levels. Compliance with this rule is expected.

## RULE 210 SPECIFIC CONTAMINANTS

Rule 210, Specific Contaminants, limits the emission rates of sulfur compounds calculated as sulfur dioxide to 0.2 percent by volume for the Sacramento Valley and Mountain Counties Air Basin portions of the Placer County Air Pollution Control District. Combustion contaminants are limited to 0.1 grains per cubic foot of gas calculated at 12 percent carbon dioxide (CO<sub>2</sub>) at standard conditions. Combustion contaminants are defined in Rule 102, Definitions, as any particulate matter.

### GE Turbine Calculations

Ambient Dry Bulb Temperature	34 degrees F
SO <sub>2</sub> Emission Rate at Peak	1.0 lbs/hr
PM-10 Emission Rate at Peak	4.6 lbs/hr
Exhaust Flowrate at Peak	1,093,524 lbs/hr
Exhaust Molecular Weight (MW)	28.5004
Percent Moisture of Exhaust	10.24%
Percent CO <sub>2</sub>	4.70 %
SO <sub>2</sub> Molecular Weight (MW)	64.0628
Molar Volume	385.3 scf/lb mole
Sulfur ppm =	$\frac{(\text{SO}_2 \text{ lbs/hr}) \times \text{Exhaust MW} \times 1,000,000}{(\text{Flowrate lbs/hr}) \times (1 - \% \text{moisture}) \times \text{SO}_2 \text{ MW} \times 60}$
	$= 0.007554 \text{ ppmv} = 7 \times 10^{-7} \%$

$$\begin{aligned} \text{PM-10 Concentration} &= \frac{(\text{PM-10 lbs/hr}) \times (1 \text{ hr}/60 \text{ min}) \times 7000 \text{ grains/lb} \times 12/\% \text{CO}_2}{(\text{Flowrate lbs/hr}) \times (60 \text{ sec/min}) \times (1 - \% \text{moisture}) / (\text{Exhaust MW}) \times (\text{Molar Volume})} \\ &= 0.000172 \text{ grains/scf @ } 12\% \text{CO}_2 \end{aligned}$$

### Alstom Turbine Calculations

Ambient Dry Bulb Temperature	34 degrees F
SO <sub>2</sub> Emission Rate at Peak	1.0 lbs/hr
PM-10 Emission Rate at Peak	4.7 lbs/hr
Exhaust Flowrate at Peak	1,063,331 lbs/hr
Exhaust Molecular Weight (MW)	28.5004
Percent Moisture of Exhaust	7.16%
Percent CO <sub>2</sub>	3.46 %
SO <sub>2</sub> Molecular Weight (MW)	64.0628
Molar Volume	385.3 scf/lb mole
Sulfur ppm =	$\frac{(\text{SO}_2 \text{ lbs/hr}) \times \text{Exhaust MW} \times 1,000,000}{(\text{Flowrate lbs/hr}) \times (1 - \% \text{moisture}) \times \text{SO}_2 \text{ MW} \times 60}$
	$= 0.007512 \text{ ppmv} = 7.5 \times 10^{-7} \%$

$$\begin{aligned} \text{PM-10 Concentration} &= \frac{(\text{PM-10 lbs/hr}) \times (1 \text{ hr}/60 \text{ min}) \times 7000 \text{ grains/lb} \times 12\% \text{CO}_2}{(\text{Flowrate lbs/hr}) \times (60 \text{ sec/min}) \times (1 - \% \text{moisture}) / (\text{Exhaust MW}) \times (\text{Molar Volume})} \\ &= 0.000238 \text{ grains/scf @ } 12\% \text{CO}_2 \end{aligned}$$

Sulfur dioxide emissions are less than 0.2%. Combustion contaminants are less than 0.1 grains/dscf. Compliance is expected and will be required by a permit condition.

### RULE 211 PROCESS WEIGHT

Rule 211, Process Weight, establishes PM emission limits as a function of process weight rate in tons/hr. Natural gas fuels are excluded from the definition of process weight by Rule 102, Definitions, Section 243, Process Weight per Hour.

This rule does apply to the cooling towers.

$$\begin{aligned} \text{Weight rate} &= 54,414 \text{ gal/min} \times 60 \text{ min/hr} \times 8.34 \text{ lb/gal} / 2000 \text{ lb/ton} \\ &= 13,614 \text{ ton/hr} \end{aligned}$$

Rule 211 emission limit

$$\begin{aligned} \text{PM} &= 17.31 \times P^{0.16} \text{ where } P = \text{tons per hour} \\ \text{PM} &= 79.3 \text{ pound/hour} \end{aligned}$$

The emission rate from the three cooling towers is 0.68 pounds/hour. This rate is less than the limit calculated above. Compliance is expected.

## RULE 218 ARCHITECTURAL COATINGS

Rule 218, Architectural Coatings, limits the VOC content of architectural coating sold or used in Placer County. Compliant coatings are generally available. Compliance is expected.

## RULE 220 ABRASIVE BLASTING

Rule 220, Abrasive Blasting, incorporates by reference the requirements of Title 17, Subchapter 6 of the California Administrative Code.

Compliance is expected.

## RULE 221 COMPLIANCE TESTS

Rule 221, Compliance Tests, except as otherwise stated, performance tests undertaken to determine compliance of sources with Regulation II must comply with the provisions of CFR 40, Part 60, Appendix A except that Method 5 shall be modified to include the impinger train catch.

Compliance is expected.

## RULE 231 INDUSTRIAL, INSTITUTIONAL AND COMMERCIAL BOILERS, STEAM GENERATORS AND PROCESS HEATERS

Rule 231 applies to boilers with rated heat inputs greater than or equal to 5 million Btu per hour used in industrial, institutional or commercial operations.

For natural gas fired units which use an annual heat input greater than or equal to 90,000 therms, NO<sub>x</sub> emissions are limited to 30 ppmv or 0.36 lbs/MMBtu. Carbon monoxide emissions are not to exceed 400 ppmv.

The project proposes to limit emissions of NO<sub>x</sub> to 9 ppmv and CO to 50 ppmv using an ultra low NO<sub>x</sub> burner and flue gas recirculation.

These emission levels comply with this rule.

## RULE 250 GAS TURBINES

Rule 250, Gas Turbines, requires the CTGs to emit NO<sub>x</sub> at levels of no greater than the following except during the thermal stabilization:

9 x EFF/25 ppm, @ 15% O<sub>2</sub>, under load conditions, averaged over 15 minutes.

Where: EFF (efficiency) is the higher of the following:

$$\text{EFF} = \frac{3412 \times 100\%}{\text{AHR}}$$

AHR = Actual Heat Rate at HHV of Fuel (BTU/KW-HR)]

= 7,540 at base load

= 8,825 at peak load

or

$$\text{EFF} = \frac{\text{MRE} \times \text{LHV}}{\text{HHV}}$$

MRE = Manufacturer's Rated Efficiency with air pollution equipment  
at LHV

Given that the proposed project is a combined cycle facility, only the former calculation is appropriate.

$$\text{NOx limit} = \frac{(9 \times 3412 \times 100\%)}{7,540 \times 25} = 16.3 \text{ ppmv base load}$$

$$= \frac{(9 \times 3412 \times 100\%)}{8,825 \times 25} = 13.9 \text{ ppmv peak load}$$

The proposed NOx emission level of 2 ppmv @ 15% O<sub>2</sub> is below the emission levels required by this rule. Compliance is expected.

## RULE 502 NEW SOURCE REVIEW

Section 301, Best Available Control Technology requires the application of best available control technology if emissions from an emission unit exceeds the trigger levels shown below:

<u>Pollutant</u>	<u>lb/day</u>
Reactive organic compounds	10
Nitrogen oxides	10
Sulfur oxides	80
PM10	80
Carbon monoxide	550
Lead	3.3
Vinyl chloride	5.5
Sulfuric acid mist	38
Hydrogen sulfide	55
Total reduced sulfur compounds	55
Reduced sulfur compounds	55

BACT is triggered for the combustion turbines, HRSGs, auxillary boiler, emergency generator and the fire pump. The proposed emission levels are expected to comply with this section.

Section 302, Offsets General, requires offsets if the facility emissions exceed the following levels:

<u>Pollutant</u>	<u>pounds per quarter</u>
Reactive organic compounds	7,500
Nitrogen oxides	7,500
Sulfur oxides	12,500
PM10	7,500
Carbon monoxide	7,500

Offsets for increases in carbon monoxide are not required if the applicant, using an air quality modeling analysis prepared pursuant to Section 402, demonstrates to the satisfaction of the Air Pollution Control Officer that the increase in ambient concentration does not exceed 500 micrograms per cubic meter, 8 hour average, at or beyond the property line of the stationary source.

The proposed equipment will have emissions which exceed the offset trigger levels for NOx, PM-10 and CO. Modeling has indicated that emissions will not increase ambient concentrations by 500 micrograms per cubic meter on an eight-hour average with the exception of commissioning of the Alstom turbine. The modeling was based on a maximum of 1000 pounds per hour of CO. CO emissions and ambient air impacts are much higher during commissioning because the oxidation catalyst is not in place to control the CO emissions. This equals 8000 pounds in an eight hour period. In order to prevent CO impacts of more than 500 micrograms per cubic meter, the CO emissions during commissioning operations must be limited to no more than  $500/603.2 \times 1000$  pounds or 829 pounds per hour. This will be a condition of the permit.

Offsets are required for PM-10 and NOx. CO offsets are not required.

Roseville Electric has identified PM-10 ERCs in sufficient quantities to offset the project. Roseville Electric has identified existing NOx ERCs and potential NOx ERCs to offset the NOx emission increases. In addition interpollutant trading of VOCs for NOx is proposed. See the offset section for further details. This complies with PCAPCD rules and regulations.

### **XIII. COMPLIANCE WITH STATE AND FEDERAL AIR RULES AND REGULATIONS**

#### **40 CFR 60 Subpart GG – Standards of Performance for Stationary Gas Turbines**

Roseville Electric is required to meet the notification, recordkeeping and performance test requirements of this regulation. Roseville Electric must

submit a written quarterly excess emission report to the Administrator. A performance test is required within 60 days of achieving maximum production or no later than 180 days of initial startup.

#### Federal Prevention of Significant Deterioration (PSD)

The PSD program applies to any new facility which is one of the 28 PSD categories in the Federal Clean Air Act and emits more than 100 tons per year of any regulated pollutant. The facility does fall into one of the 28 PSD categories but does not have a potential to emit of greater than 100 tons per year of a regulated pollutant. The facility is not required to comply with PSD.

#### California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines

The diesel engines driving the emergency generator and the fire pump will be required to meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective. This regulation is currently undergoing legal and the effective date is expected to be January 1, 2005 or shortly thereafter.

This regulation establishes control level for diesel engines. The regulation does allow a stationary emergency engine to limit hours of operation for maintenance and testing to 20 hours per year instead of meeting additional control requirements or emission levels.

Compliance is expected.

#### Health and Safety Code Section 40709.6, Offset System

Health and Safety Code Section 40709.6, Offset System, requires inter-district offsets to be approved by a resolution of the governing boards of both the upwind air district, where the emission reductions are to be credited (i.e. where the reductions occur, and from which the ERCs are transferred), and the downwind air district, where the emission increases are to be offset (i.e. where there will be emission increases requiring the use of ERCs).

The transfer of ERC Certificates YSAQMD EC-209 and EC-210 under option agreement from Calpine was approved by the YSAQMD Board and the PCAPCD Board in June, 2004.

The use of ERCs from the SMAQMD bank will require the approval of both SMAQMD Board and the PCAPCD Board.



#### **XIV. DETERMINATION**

The Roseville Energy Project is expected to meet the requirements of PCAPCD Rules and Regulations, subject to the proposed conditions shown on the following pages.

## CONSTRUCTION MITIGATION

PCAPCD staff has reviewed the proposed mitigation conditions in the PSA. The Energy Commission staff has proposed mitigation which satisfies the PCAPCD. The mitigation listed in the PDOC has been removed from this document.

The PCAPCD staff recommend the following permit conditions for the REP project:

## SPECIFIC FACILITY CONDITIONS

### OFFSETS

1. If the GE LM-6000 turbines are selected, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the PCAPCD Rule 502, New Source Review (8/01). (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions under PCAPCD Rules and Regulations.)

<b>Table 48 – GE LM6000 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
PM-10	17,523	15,246	18,999	18,788	35.28

2. The ERC certificates to be surrendered if the GE LM-6000 turbines are selected shall include the following:

<b>Table 49 – ERCs GE LM6000</b>						
<b>NO<sub>x</sub></b>	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
Current Owner of Certificate						
City of Roseville	PCAPCD/ 2001-23 (2004-03)	5,050	5,050	5,050	5,050	10.1
Calpine Corp.	YSAQMD/ EC-209 (EC-238)	0	6,199	0	3,188	4.69
Calpine Corp.	YSAQMD/ EC-210	0	9,558	0	3,973	6.77
Energy 2001/ SMAQMD Bank		5,300	5,300	5,250	4,150	10.00
<b>VOCs for NO<sub>x</sub></b>	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-26 (2004-04)	33,512	33,512	33,512	33,512	67.0
<b>PM-10</b>	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-24 (2004-04)	22,680	0	13,252	21,490	28.71
City of Roseville	PCAPCD/ 2001-22 (2004-02)	2,578	19,820	16,085	15,916	27.20

3. If the Alstom GX100 turbines are selected, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the PCAPCD Rule 502, New Source Review (8/01). (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions under PCAPCD Rules and Regulations.)

**Table 50 - ALSTOM GX100 - OFFSETS REQUIRED**

POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
PM-10	17,673	15,513	19,168	19,158	35.95

4. The ERC certificates to be surrendered If the Alstom turbines are selected shall include the following:

**Table 51 – ERCs ALSTOM GTX-100**

<b>NOx</b>	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
Current Owner of Certificate						
City of Roseville	PCAPCD/ 2001-23 (2004-03)	5,050	5,050	5,050	5,050	10.1
Calpine Corp.	YSAQMD/ EC-209 (EC-238)	0	6,199	0	3,188	4.70
Calpine Corp.	YSAQMD/ EC-210	0	9,558	0	3,973	6.77
Energy 2001/ SMAQMD Bank		5,300	5,300	5,250	4,150	10.00
<b>VOCs for NOx</b>	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-26	33,512	33,512	33,512	33,512	67.0
<b>PM-10</b>	District/ Certificate	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
City of Roseville	PCAPCD/ 2001-24	2,578	20,167	16,085	15,916	27.37
City of Roseville	PCAPCD/ 2001-22	22,680	-	13,440	22,680	29.40
Enron North America	PCAPCD/2 2001-24 (2004-06)	362	-	420	-	0.39

5. The ERC Certificates PCAPCD 2001-23, YSAQMD EC-209 (EC-238), YSAQMD EC-210, PCAPCD 2001-26, PCAPCD 2001-24 and PCAPCD/2001-22 shall be submitted to the PCAPCD at least 30 days prior to start of construction. Copies of the ERCs surrendered shall be submitted to the Energy Commission by that date. For the purpose of this condition, start of construction shall be defined as the pouring of foundation on site.
6. ERCs obtained from reductions at Energy 2001 shall be submitted to the PCAPCD at least 30 days prior to commencing operation of any of the stationary source equipment (gas turbines, boiler, emergency fire pump, or emergency generator). Copies of the ERCs surrendered shall be submitted to the Energy Commission by that date. For the purpose of this condition, commencing operation shall be defined as first fire of any of the stationary source equipment listed herein.
7. The NO<sub>x</sub> ERCs listed in the Energy 2001 row may alternatively be obtained in part at or in whole from the Sacramento Air Quality Management District (SMAQMD) Bank at an offset ratio of 2.1 to 1. The offset ratio of 1.3 to 1 shall apply to Energy 2001 offsets. An offset ratio of 2.1 to 1 shall apply to SMAQMD Bank offsets. The combined quantity shall be sufficient to offset the following NO<sub>x</sub> emissions:

Table 51					
NO <sub>x</sub>	Quarter 1 (lbs)	Quarter 2 (lbs)	Quarter 3 (lbs)	Quarter 4 (lbs)	Annual (Tons)
	4,077	4,077	4,038	3,192	7.69

Compliance to be determined by the following :

$$(\text{NO}_x \text{ ERCs Energy 2001} / 1.3) + (\text{NO}_x \text{ ERCs SMAQMD Bank} / 2.1) = \text{Quarterly requirement.}$$

8. ERCs obtained from the SMAQMD Bank shall be submitted to the PCAPCD at least 30 days prior to commencing operation of any of the stationary source equipment (gas turbines, boiler, emergency fire pump, or emergency generator). Copies of the ERCs surrendered shall be submitted to the Energy Commission by that date. For the purpose of this condition, commencing operation shall be defined as first fire of any of the stationary source equipment listed herein.
9. Prior to the use of ERCs from the SMAQMD Bank, Roseville Electric shall appear before the PCAPCD District Board and gain approval of the transfer of ERCs per Health and Safety Code, Section 40709.6, Offset by reduction to stationary source located in another District.

## **OPERATING CONDITIONS**

10. The gas turbines and auxillary boiler shall be fired exclusively on pipeline grade natural gas.
11. Roseville Electric shall maintain an Operating Compliance Plan for the new CTG/HRSG which will assure that the air pollution control equipment will be properly maintained and that necessary operational procedures are in place to continuously achieve compliance with this permit. The Operating Compliance Plan shall include a description of the process monitoring program and devices to be used.
  - A. The plan shall specify the frequency of surveillance checks that will be made of process monitoring devices and indicators to determine continued operation within permit limits. A record or log of individual surveillance checks shall be kept to document performance of the surveillance.
  - B. The plan shall include the frequency and methods of calibrating the process monitoring devices.
  - C. The plan shall specify for each emission control device:
    - i. Operation and maintenance procedures that will demonstrate continuous operation of the emission control device during emission producing operations; and
    - ii. Records that must be kept to document the performance of required periodic maintenance procedures.
  - D. The plan shall identify what records will be kept to comply with air pollution control requirements and regulations and the specific format of the records. These records shall include at least the Recordkeeping information required by this permit. The information must include emission monitoring evaluations, calibration checks and adjustments, and maintenance performed on such monitoring systems.
  - E. The plan shall be submitted to the PCAPCD 30 days prior to startup of the gas turbines and boiler. The plan must be implemented upon approval by the PCAPCD Air Pollution Control Officer.
  - F. The plan shall be resubmitted to the PCAPCD for approval upon any changes to compliance procedures described in the plan, or upon the request of the PCAPCD Air Pollution Control Officer

12. CEMS Remote Polling:

- A. Roseville Electric shall install and maintain equipment, facilities, software and systems at the facility and at the PCAPCD office that will allow the District to poll or receive electronic data from the CEMS. Roseville Electric shall make CEMS data available for automatic polling of the daily records. Roseville Electric shall make hourly records available for manual polling within no more than a one hour delay. The basic elements of this equipment include a telephone line, modem and datalogger. Alternatively, an internet based system may be used. The costs of installing and operating this equipment, excluding District costs, shall be borne by the REP.
- B. Upon notice by the District that the facility's polling system is not operating, the REP shall provide the data by a District-approved alternative format and method for up to a maximum of 30 days.
- C. The polling data is not a substitute for other required recordkeeping or reporting. (Rule 404 § C; Rule 501 § 304.2.c; HSC 42706)

**OPERATING LIMITATIONS**

13. The hours of operation of each gas turbine shall not exceed the following:

<b>Table 53 – Power Plant Gas Turbine Operating Schedule</b>					
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	<b>Annual</b>
Total operating hours	2,096	1,864	2,132	2,145	8,237

- 14. Roseville Electric shall submit design details for the selective catalytic reduction, oxidation catalyst, and continuous emission monitor system to the PCAPCD at least 30 days prior to commencement of construction of these components.
- 15. Roseville Electric shall install a selective catalytic reduction (SCR) system and an oxidation catalyst on the gas turbine. The SCR and oxidation catalyst equipment shall be operated whenever the gas turbine is operated except during commissioning.
- 16. The gas turbine engine and generator lube oil vents shall be equipped with mist eliminators.

17. The gas turbines and auxiliary boiler shall be equipped with continuously recording, nonresettable fuel gas flowmeters on each unit.
18. Each gas turbine exhaust shall be equipped with continuously recording emissions monitor for NO<sub>x</sub>, CO, and O<sub>2</sub> dedicated to this unit. Continuous emission monitor shall meet the requirements of 40 CFR parts 60 and 75, and shall be capable of monitoring emissions during startups and shutdowns as well as normal operating conditions. The system shall be installed and operational prior to the cessation of commissioning when their operability will be confirmed by source testing.
19. The gas turbine exhaust stacks and boiler exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods. Access ladders and/or stairs and platforms shall allow easy access to the sampling ports.
20. The gas turbine engine shall be fired exclusively on pipeline quality natural gas with a sulfur content no greater than 0.50 grains of sulfur compounds per 100 dry scf of natural gas.
21. Startup is defined as the period beginning with turbine light-off (firing) until the unit meets the lb/hr and ppmv emission limits in conditions 52, 54 and 55. Shutdown is defined as the period beginning with initiation of turbine shutdown sequence and ending with cessation of firing of the gas turbine engine. Startup and shutdown durations shall not exceed 3.0 hours and 1 hour, respectively, per occurrence.
22. NO<sub>x</sub>, excluding the thermal stabilization period (i.e. startup period which is not to exceed 3 hours), shall not exceed the following levels under load conditions:

9 x EFF/25 ppm, @ 15% O<sub>2</sub>, averaged over 15 minutes:

Where: EFF (efficiency) is the higher of the following:

$$EFF_1 = \frac{3412 \times 100\%}{AHR}$$

AHR = Actual Heat Rate at HHV of Fuel (BTU/KW-HR)]

or

$$EFF_2 = \frac{MRE \times LHV}{HHV}$$

MRE = Manufacturer's Rated Efficiency with Air Pollution Equipment at LHV, which is the manufacturer's continuous rated percent efficiency of the gas turbine with air pollution equipment



after correction from LHV to HHV of the fuel at peak load for that facility.

### **COMMISSIONING**

23. The commissioning period commences when all mechanical and electrical systems are installed and individual startup has been completed or when a gas turbine is first fired whichever comes first. The period ends when the plant has completed performance testing and is available for commercial operation.
24. The gas turbines shall be tuned to minimize the air emissions. At the earliest feasible time, in accordance with the recommendations of the equipment manufacturer and construction contractor, the air pollution control equipment shall be installed, adjusted and operated to minimize emissions from the combustion turbines.
25. The total number of firing hours of each gas turbine without abatement shall not exceed 160 hours during the commissioning period. Such operation shall only be limited to such activities that can only be properly executed without the air pollution control equipment. The total operating days during conditioning shall not exceed 33 calendar days.
26. During the commissioning operations, CO emissions shall not exceed 829 pounds per hour for any one-hour block average. Compliance to be determined by emission factors to be determined prior to startup and approved by the District. (This condition was established to prevent impacts from exceeding 500 ug/m<sup>3</sup> over an 8-hour average).
27. The total mass emissions of each regulated pollutant that are emitted during the commissioning period shall not exceed the quarterly emission limits specified in these conditions.

### **REPORTING AND RECORDKEEPING**

28. Roseville Electric shall submit a CEMS QA/QC plan to the PCAPCD for approval. Approval should also be required for any future changes to the plan.
29. Roseville Electric shall submit to the PCAPCD, prior to issuance of a Permit to Operate, information correlating the control system operating parameters to the associated NO<sub>x</sub>, CO, PM-10, VOC and SO<sub>x</sub> emissions. This information may be used by the PCAPCD Air Pollution Control Officer to determine compliance where there is no continuous emission monitoring

system available or when the continuous emission monitoring system is not operating properly.

30. Provide source test information annually regarding the exhaust gas NO<sub>x</sub> concentration at ISO conditions corrected to 15 percent oxygen on a dry basis, and the demonstrated percent efficiency (EFF) of the turbine unit.
31. A gas turbine operating log shall be kept which includes, on a daily basis, the actual Pacific Standard Time start-up and stop time, total hours of operation, type and quantity of fuel used (liquid/gas). This information shall be available for inspection at any time from the date of entry.
32. Hourly records of NO<sub>x</sub> and CO emission concentrations (ppmv @ 15% O<sub>2</sub>), and hourly, daily, and quarterly records of NO<sub>x</sub> and CO emissions shall be kept. Ongoing compliance with the CO emission limits during normal operation shall be deemed compliance with the VOC emission limits during normal operation.
33. Records of SO<sub>x</sub> lb/hr, lb/day, and lb/quarter emissions shall be kept. SO<sub>x</sub> emissions shall be based on fuel use records, natural gas sulfur content, and mass balance calculations.
34. The following records shall be kept: occurrence, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during which a continuous monitoring system or monitoring device was inoperative, maintenance of any continuous emission monitor emission measurements, total daily and rolling twelve month average hours of operation, hourly quantity of fuel used, and gross three hour average operating load.
35. All records which are required to be maintained by this permit shall be maintained for a period of five years and shall be made readily available for District inspection upon request. Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P. paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA.
36. Roseville Electric shall notify the PCAPCD of any breakdown condition as soon as reasonably possible, but no later than two PCAPCD business hours after its detection.
37. Any violation of any emission standard listed in this permit which is indicated by the CEMS shall be reported to the PCAPCD no later than 96 hours after such occurrence per California Health and Safety Code 42706.

38. The PCAPCD shall be notified in writing within seven calendar days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations.
39. Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The PCAPCD shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the PCAPCD.
40. Roseville Electric shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F.
41. Roseville Electric shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred.
42. Roseville Electric shall provide the PCAPCD with a written emission statement showing actual emissions of volatile organic compounds and oxides of nitrogen. Pursuant to PCAPCD Rule 503 Roseville Electric shall submit this emission statement on a form or in a format specified by the PCAPCD Air Pollution Control Officer. The statement shall contain the following information:
  - A. Information contained in the California Air Resources Board's Emission Inventory Turn Around Document as described in Instructions for the Emission Data System Review and Update Report; and
  - B. Actual emissions of volatile organic compounds and oxides of nitrogen, in tons per year, for the calendar year prior to the preparation of the emission statement; and
  - C. Information regarding seasonal or diurnal peaks in the emission of affected pollutants; and
  - D. Certification by a responsible official of Roseville Electric that the information contained in the emission statement is accurate to the best knowledge of the individual certifying the emission statement.

## **PERFORMANCE TESTING**

43. Compliance with the short term emission limits (lb/hr and ppmv @ 15% O<sub>2</sub>) shall be demonstrated by a performance test conducted within 60 days of reaching maximum production and not later than 180 days after initial startup of each gas turbine engine.
44. A performance test shall be conducted annually for each combustion turbine/heat recovery steam generator unit.
45. Compliance with the cold start NO<sub>x</sub>, and CO mass emission limits shall be demonstrated for each of the gas turbines by performance testing no later than 180 days after initial operation and at least once every seven years thereafter by an ARB certified independent test firm.
46. The following test methods shall be used PM<sub>10</sub>: EPA Method 202 (front half and back half), NO<sub>x</sub>: EPA Method 20, CO: EPA Method 10, VOC: EPA method 18, and fuel gas sulfur content: ASTM D3246. Alternative test methods as approved by the PCAPCD may also be used to address the source testing requirements of this permit.

## **EMISSION LIMITATIONS**

47. No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)
48. Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions. (Rule 202)
49. Particulate matter emissions shall not exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO at standard conditions. (Rule 210)
50. Sulfur compound emissions calculated as SO<sub>2</sub> shall not exceed 0.2 percent by volume. (Rule 210).
51. The ammonia slip shall not exceed 10 ppmv @15% O<sub>2</sub>. Compliance with ammonia slip shall be demonstrated by using the following calculation procedure:

Ammonia slip ppmv @ 15% O<sub>2</sub> = ((a-(bxc/1,000,000))x1,000,000)/b x d.  
where

a = ammonia injection rate (lb/hr)/17 (lb/lb.mol.),

b = dry exhaust gas flow rate (lb/hr)/29(lb/lb.mol.),

c = change in measured NO<sub>x</sub> concentration ppmv at 15% O<sub>2</sub>

across catalyst,  
d = correction factor

The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip.

52. The emissions from the gas turbine after air pollution controls shall not exceed the following:

<b>Table 53 - Gas Turbine PPMV Limitations Excluding Startup, Shutdown and Excursions</b>		
NO <sub>x</sub>	CO	VOC
2.0 ppmvd @ 15% O <sub>2</sub> , 1-hour average	4 ppmvd @ 15% O <sub>2</sub> , 3-hour average	2 ppmvd @ 15% O <sub>2</sub> , 1-hour average

53. The 2.0 ppmvd NO<sub>x</sub> emission limit is averaged over 1 hour at 15 percent oxygen, dry basis. The limit shall not apply to the first six (6) 1-hour average NO<sub>x</sub> emissions above 2.0 ppmvd, dry basis at 15% O<sub>2</sub>, in any calendar quarter period for each combustion gas turbine provided that it meets all of the following requirements:

- A. This equipment operates under any one of the qualified conditions described below:
1. Rapid combustion turbine load changes due to the following conditions:
    - i. Load changes initiated by the California ISO or a successor entity when the plant is operating under Automatic Generation Control; or
    - ii. Activation of a plant automatic safety or equipment protection system which rapidly decreases turbine load
  2. The first two 1-hour reporting periods following the initiation/shutdown of a fogging system injection pump
  3. The first two 1-hour reporting periods following the initiation/shutdown of combustion turbine water injection
  4. The first two 1-hour reporting periods following the initiation of HRSG duct burners
  5. Events as the result of technological limitations identified by the operator and approved in writing by the PCAPCD.
- B. The 1-hour average NO<sub>x</sub> emissions above 2.0 ppmv, dry basis at 15% O<sub>2</sub>, did not occur as a result of operator neglect, improper operation or maintenance, or qualified breakdown under Rule 404, Upset Conditions, Breakdown or Scheduled Maintenance. Notification to the PCAPCD is required within two hours of a qualified event.

- C. The qualified operating conditions described in (A) above are recorded in the plant's operating log within 24 hours of the event, and in the CEMS by 5 p.m. the next business day following the qualified operating condition. The notations in the log and CEMS must describe the date and time of entry into the log/CEMS and the plant operating conditions responsible for NO<sub>x</sub> emissions exceeding the 2.0 ppmv 1-hour average limit. In addition, these excursions must be identified in the CEMS quarterly reports.
- D. The 1-hour average NO<sub>x</sub> concentration for periods that result from a qualified operating condition does not exceed 25 ppmv, dry basis at 15 percent O<sub>2</sub>.
- E. All NO<sub>x</sub> emissions during these events shall be included in all calculations of hourly, daily, and annual mass emission rates as required by this permit.
54. If the GE LM6000 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust during startup and shutdown shall not exceed the following:

<b>Table 55 – GE LM6000 Combustion Turbine Emission Limitations during Startup and Shutdown</b>		
Pollutant	Maximum Pounds Per Hour (worst-case turbine)	Pounds per Startup or Shutdown (both turbines combined)
NO <sub>x</sub>	19.3	49.7
CO	14.3	42.2

55. If the Alstom GX100 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust during startup and shutdown shall not exceed the following:

<b>Table 56 – Alstom GX100 Combustion Turbine Emission Limitations during Startup and Shutdown</b>		
Pollutant	Maximum Pounds Per Hour (worst-case turbine)	Pounds per Startup or Shutdown (both turbines combined)
NO <sub>x</sub>	37.1	122.8
CO	89.5	204.8

56. If the GE LM6000 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust, except during startup and/or shutdown or excursions, shall not exceed the following:

**Table 57 - GE LM6000 - COMBUSTION TURBINE EMISSION LIMITATIONS PER TURBINE EXCLUDING STARTUP AND SHUTDOWN**

POLLUTANT	POUNDS/HOUR
Carbon Monoxide (CO)	6.1 (three-hour rolling average)
Nitrogen Oxides (NOx)	5.0 (one-hour average)
PM-10	4.6
Sulfur Oxides (SOx)	1.0
Volatile Organic Compounds (VOCs)	1.7

57. If the Alstom GX100 turbines are selected for the project, emission rates from each gas turbine and heat recovery steam generator exhaust, except during startup and/or shutdown, or excursions shall not exceed the following:

**Table 58 - Alstom GTX100 - COMBUSTION TURBINE EMISSION LIMITATIONS PER TURBINE EXCLUDING STARTUP AND SHUTDOWN**

POLLUTANT	POUNDS/HOUR
Carbon Monoxide (CO)	6.2 (three-hour rolling average)
Nitrogen Oxides (NOx)	5.1 (one-hour average)
PM-10	4.7
Sulfur Oxides (SOx)	1.0
Volatile Organic Compounds (VOCs)	1.8

58. If the GE LM6000 turbines are selected for the project, the daily emissions shall not exceed the following rates:

<b>Table 59 – GE LM6000 - DAILY EMISSION LIMITS</b>					
POLLUTANT	Two GE Turbines	Auxiliary Boiler	Cooling Tower	Diesel Emergency Generator	Diesel Fire Pump
NO <sub>x</sub>	268.7	16.8	--	4.31	1.72
CO	300.8	52.8	--	0.84	0.09
VOC	83.6	7.2	--	0.16	0.05
PM <sub>10</sub>	221.6	14.4	16.3	0.14	0.03
SO <sub>2</sub>	46.0	1.92	--	0.10	0.19

59. If the Alstom GX100 turbines are selected for the project, the daily emissions shall not exceed the following rates:

<b>Table 60 – Alstom GX100 - FACILITY DAILY EMISSION LIMITS</b>					
POLLUTANT	Two Alstom Turbines	Auxiliary Boiler	Cooling Tower	Diesel Emergency Generator	Diesel Fire Pump
NO <sub>x</sub>	406.0	16.8	--	4.31	1.72
CO	629.5	52.8	--	0.84	0.09
VOC	223.1	7.2	--	0.16	0.05
PM <sub>10</sub>	226.8	14.4	16.3	0.14	0.03
SO <sub>2</sub>	47.1	1.92	--	0.10	0.19

60. If the Alstom GTX100 turbine are selected, the quarterly emissions shall not exceed the levels shown below:

<b>Table 61 – Alstom GTX100 Gas Turbines</b>							
Pollutant	Lbs/hr Max Two Turbine	Lbs/day Max Two Turbines	Quarter 1 (lbs/quarter) Two turbines	Quarter 2 (lbs/quarter) Two Turbines	Quarter 3 (lbs/quarter) Two turbines	Quarter 4 (lbs/quarter) Two Turbines	Tons/ Year Two Turbines
NO <sub>x</sub>	74.2	406.0	15,399	12,965	17,496	15,422	30.64
CO	179.0	629.5	26,787	32,590	28,175	29,862	58.71
VOCs	39.4	223.1	5,791	7,306	6,630	6,848	13.29
PM-10	6.4	211.8	16,300	13,692	17,789	17,569	32.67
SO <sub>x</sub>	1.3	44.0	3,385	2,843	3,694	3,648	6.78

61. If the GE LM6000 turbines are selected, the quarterly emissions shall not exceed the levels shown below:

<b>Table 62 - GE LM6000 Gas Turbines</b>							
Pollutant	Lbs/hr Max Two Turbine	Lbs/day Max Two Turbines	Quarter 1 (lbs/quarter) Two Turbines	Quarter 2 (lbs/quarter) Two Turbines	Quarter 3 (lbs/quarter) Two Turbines	Quarter 4 (lbs/quarter) Two Turbines	Tons/year Two Turbines
NO <sub>x</sub>	38.7	268.7	15,399	12,965	17,496	15,422	30.64
CO	28.7	300.8	21,291	18,454	23,160	22,982	42.94
VOCs	3.5	83.6	6,006	5,038	6,555	6,473	12.04
PM-10	9.2	221.6	15,968	13,425	17,410	17,199	32.00
SO <sub>x</sub>	1.9	46.0	3,316	2,788	3,615	3,571	6.65



62. If the GE LM6000 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 63 – GE LM6000 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM <sub>10</sub>	17,523	15,246	18,999	18,788	35.28
SO <sub>2</sub>	3,331	2,838	3,630	3,587	6.69

63. If the Alstom GX100 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 64 - ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM <sub>10</sub>	17,673	15,513	19,168	19,158	35.95
SO <sub>2</sub>	3,400	2,893	3,709	3,663	6.83

64. 40 CFR 60 Subpart GG – Standards of Performance for Stationary Gas Turbines

The gas turbines are required to meet the notification, recordkeeping and performance test requirements of this regulation. Roseville Electric must submit a written quarterly excess emission report to the Administrator. A performance test is required within 60 days of achieving maximum production or no later than 180 days of initial startup.

## **COOLING TOWERS**

### **OPERATING LIMITATIONS**

- 65. Permittee shall submit drift eliminator design details at least 30 days prior to commencement of construction of the cooling towers basin.
- 66. No hexavalent chromium containing compounds shall be added to the cooling water.
- 67. Drift eliminator drift rate shall not exceed 0.0005% of the circulating water flow.

### **PERFORMANCE TESTING**

- 68. An analysis of the cooling tower water shall be performed within 180 days of initial operation and annually thereafter.

### **EMISSION LIMITATIONS**

- 69. No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)
- 70. PM-10 emission rate shall not exceed the following:

<b>Table 65 - COOLING TOWER EMISSION LIMITATIONS</b>					
<b>Pollutant</b>	<b>POUNDS PER DAY</b>	<b>QUARTER 1 (Pounds/quarter)</b>	<b>QUARTER 2 (Pounds/quarter)</b>	<b>QUARTER 3 (Pounds/quarter)</b>	<b>QUARTER 4 (Pounds/quarter)</b>
PM-10	16.3	1,471	1,487	1,504	1,504

- 71. Compliance with the PM-10 emission limit shall be demonstrated as follows:  
PM-10 = cooling water recirculation rate \* total dissolved solids concentration in the blowdown water \* design drift rate.

## **AUXILLARY BOILER**

### **OPERATING LIMITATIONS**

72. An ultra-low NO<sub>x</sub> burner and flue gas recirculation system shall be installed and operated on the auxillary boiler.
73. A non-resetable fuel meter shall be installed on the gas line serving the boiler.
74. The hours of operation of the auxillary boiler shall not exceed the following:

<b>Table 66 – Boiler Hours of Operation</b>				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Boiler Hours of Operation	140	568	143	143

### **PERFORMANCE TESTING**

75. Compliance with the boiler emission limits on pounds per hour and ppmv emission limits shall be demonstrated by an initial performance test conducted within 60 days of reaching maximum production and not later than 180 days from initial startup.
76. The initial performance test shall be conducted for NO<sub>x</sub>, VOC, SO<sub>x</sub>, PM-10, CO, CO<sub>2</sub>, and O<sub>2</sub>.
77. Performance tests shall be conducted on the boiler every other calendar year after the initial testing. These tests shall include NO<sub>x</sub>, CO, CO<sub>2</sub>, and O<sub>2</sub>.
78. All boiler source tests shall be made in the as-found operating condition, except that source tests shall include at least one test conducted at the maximum feasible firing rate allowed by the PCAPCD permit. No source test shall be conducted within two hours after a continuous period in which fuel flow to the unit is zero, or shut off, for thirty minutes or longer.
79. At least thirty (30) days prior to the compliance source tests, a written test plan detailing the test methods and procedures to be used shall be submitted for approval by the PCAPCD Air Pollution Control Officer. The plan shall cite the test methods to be used for the determination of compliance with the emission limitations of this rule.
80. A report of the compliance test shall be submitted to the PCAPCD within sixty (60) days of completion of the source test.

### **EMISSION LIMITATIONS**

81. The NO<sub>x</sub> emissions from the boiler shall not exceed 9.0 ppmv @ 3% O<sub>2</sub> on a three hour average.
82. The CO emissions from the boiler shall not exceed 50 ppmv @ 3% O<sub>2</sub> on a three hour average.
83. The boiler emissions shall not exceed any of the following:

<b>Table 67 - BOILER EMISSION LIMITATIONS</b>					
<b>Pollutant</b>	<b>POUNDS Per Hour</b>	<b>QUARTER 1 (Pounds/quarter)</b>	<b>QUARTER 2 (Pounds/quarter)</b>	<b>QUARTER 3 (Pounds/quarter)</b>	<b>QUARTER 4 (Pounds/quarter)</b>
NO <sub>x</sub>	0.7	92	372	94	94
CO	2.2	311	1,259	317	317
VOC	0.3	36	144	36	36
PM <sub>10</sub>	0.6	82	332	84	84
SO <sub>2</sub>	0.08	11	46	12	12

## **DIESEL FIRED IC ENGINE POWERING FIRE PUMP**

### **OPERATING LIMITATIONS**

84. Permittee shall submit IC engine design details to the PCAPCD at least 30 days prior to commencement of construction of the fire water pump foundation.
85. A non-resetable hour meter shall be installed on each engine/generator set to record the hours of operation.
86. Operation for maintenance and testing of the diesel engine fire pump shall be limited to 50 hours per year.
87. Operation for other than maintenance and testing purposes shall be limited to involuntary interruptions of electrical power. Operation shall not exceed 24 hours without prior authorization by the PCAPCD Air Pollution Control Officer.
88. The sulfur content of the diesel fuel used shall not exceed 15 ppm by weight.

### **REPORTING AND RECORDKEEPING**

89. Records of operation and maintenance shall be kept by the Owner or Operator for a period of five years and shall be made available to the PCAPCD upon request. Information required for reporting to the PCAPCD includes, but is not limited to:
  - A. The hours of operation the engine was run for maintenance and testing.
  - B. The hours of operation the engine was run during interruption of electrical power.
  - C. Records of the sulfur content of the diesel fuel used.

### **EMISSION LIMITATIONS**

90. No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance.
91. Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions.

92. Particulate matter emissions shall not to exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO at standard conditions.
93. Sulfur compound emissions calculated as SO<sub>2</sub> shall not exceed 0.2 percent by volume.
94. Nitrogen oxide emissions from the fire pump diesel engine shall not exceed 6.9 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.
95. PM-10 emissions from the fire pump diesel engine shall not exceed 0.4 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.
96. The fire pump diesel engine shall meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective.

## **DIESEL IC ENGINE POWERING EMERGENCY GENERATOR**

### **OPERATING LIMITATIONS**

97. Permittee shall submit IC engine design details to the PCAPCD at least 30 days prior to commencement of construction of the IC engine foundation.
98. A non-resetable hour meter shall be installed on each engine/generator set to record the hours of operation.
99. Operation for maintenance and testing of the emergency diesel engine and generator shall be limited to 50 hours per year.
100. Operation for other than maintenance and testing purposes shall be limited to involuntary interruptions of electrical power. Operation shall not exceed 24 hours without prior authorization by the PCAPCD Air Pollution Control Officer.
101. The sulfur content of the diesel fuel used shall not exceed 15 ppm by weight.

### **REPORTING AND RECORDKEEPING**

102. Records of operation and maintenance shall be kept by the Owner or Operator for a period of five years and shall be made available to the PCAPCD upon request. Information required for reporting to the PCAPCD includes, but is not limited to:
  - A. The hours of operation the engine was run for maintenance and testing.
  - B. The hours of operation the engine was run during interruption of electrical power.
  - C. Records of the sulfur content of the diesel fuel used.

### **EMISSION LIMITATIONS**

103. No emissions are permitted, from any source, which are a nuisance per PCAPCD Rule 205, Nuisance. (Rule 205)
104. Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of PCAPCD Rule 202, Visible Emissions. (Rule 202)

105. Particulate matter emissions shall not to exceed 0.1 grains per cubic foot of gas calculated at 12 percent CO at standard conditions. (Rule 210)
106. Sulfur compound emissions calculated as SO<sub>2</sub> shall not exceed 0.2 percent by volume. (Rule 210).
107. Nitrogen oxide emissions from the emergency generator diesel engine shall not exceed 6.9 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.
108. PM-10 emissions from the emergency generator diesel engine shall not exceed 0.4 grams per brake horsepower - hour. This may be demonstrated by manufacturer's emissions data sheet.
109. The engine shall meet the requirements of the California Air Resources Board Airborne Toxic Control Measure for Stationary Compression Ignition Engines when it becomes effective.

#### **PORTABLE EQUIPMENT**

110. Portable equipment shall comply with all applicable requirements while operating at the facility, including PCAPCD Permit and Prohibitory Regulations, or be State-registered portable equipment. State-registered portable equipment shall comply with State registration requirements. A copy of the State registration shall be readily available whenever the State-registered portable equipment is at the facility.

#### **TITLE V CONDITION**

111. The Owner/Operator shall file a complete application for a Title V permit pursuant to Rule 507, Federal Operating Permit Program by no later than one year after commencing operation.

#### **PCAPCD GENERAL CONDITIONS**

112. Authorization to construct the equipment listed and as prescribed in the approved plans and specifications is hereby granted, subject to the specified permit conditions. The construction and operation of listed equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted in the conditions. Deviation from the approved plans is not permissible without first securing approval for the changes from the PCAPCD Air Pollution Control Officer. (Rule 501)
113. Written notification shall be submitted to the PCAPCD no later than seven (7) days after completion of construction. (Rule 501)



114. This permit shall be maintained on the premises of the subject equipment. (Rule 501)
115. The authorized PCAPCD agents shall have the right of entry to any premises on which an air pollution emission source is located for the purpose of inspecting such source, including securing samples of emissions therefrom, or any records required to be maintained therewith by the PCAPCD. (Rule 402)
116. In the event of any violation of the PCAPCD Rules and Regulations, Roseville Electric shall take action to end such violation. (Rule 502)
117. Roseville Electric shall notify the PCAPCD within two hours of any upset conditions, breakdown or scheduled maintenance which cause emissions in excess of limits established by PCAPCD Rules and Regulations. (Rule 404)
118. Any alteration of the subject equipment, including a change in the method of operation, shall be reported to the PCAPCD. Such alternations may require an Authority to Construct Permit. (Rule 501)
119. Exceeding any of the limiting condition is prohibited without prior application for, and the subsequent granting of a permit modification pursuant to PCAPCD Rule 501, General Permit Requirements, Section 400.
120. In the event of a change of ownership, an application must be submitted to the PCAPCD. Upon any change in control or ownership of facilities constructed, operated, or modified under authority of this permit, the requirements contained in this Authority to Construct shall be binding on all subsequent owners and operators. (Rule 501)
121. Compliance of the permitted facility is required with the provisions of the "Air Toxics 'Hot Spots' Information and Assessment Act" of 1987 (Health and Safety Code Sections 44300 et seq.).
122. Performance Test Requirements: If the PCAPCD finds that additional performance tests are required to determine compliance with PCAPCD Rules and Regulations and Conditions of this Authority to Construct, reasonable written notice shall be provided to Roseville Electric. The performance tests shall be subject to the following restrictions (Rule 501):

- A. At least thirty (30) days prior to the actual testing, a written test plan shall be submitted to the PCAPCD Air Pollution Control Officer detailing the sampling methods, analytical methods or detection principles to be used. The prior written approval of the PCAPCD Air Pollution Control Officer is required for the use of alternate test methods.
- B. The PCAPCD may require, upon reasonable written notice, the conduct by Roseville Electric of such emissions testing or analysis as may be deemed necessary by the PCAPCD to demonstrate compliance with PCAPCD Rules and Regulations and the limiting conditions of this permit.
- C. Testing shall be conducted in accordance with 40 CFR 60, Appendix A, Methods, or equivalent methods approved by the State of California Air Resources Board (ARB) by reference in Title 17 of the California Administrative Code, or other methods specified by Roseville Electric and approved in writing by the PCAPCD Air Pollution Control Officer. Independent testing contractors and analytical laboratories shall be Air Resources Board certified for the test or analysis conducted. Particulate matter testing, if requested, shall include both filterable and condensed particulate matter (e.g. Method 5 modified to include impinger catch).
- D. A report of the testing shall be submitted to the PCAPCD no later than sixty (60) days after the source test is performed.